in memorizing the Koran, have been enlisted to teach but the Ministry of Education is now replacing them with trained teachers. Children attend school from early morning until noon six days a week.

With the appointment of a representative of the Ministry of Education to the provincial government of Girishk, a more active official interest in education in the area has taken place. A Board of Education has been formed to which HVA and ICA send representatives. Public school teachers have been promised by the Ministry of Education to staff schools as rapidly at the Board can have them constructed. The construction of simple school buildings does not create a serious problem as they are expected to be built by communities with the prompting of village-level workers. The supply of primary teachers in the country, however, is very limited. Equipment of the schools with blackboards, maps, textbooks and school supplies is also a serious difficulty, and preparation of modern teaching materials and pupils' books adapted to Afghanistan requires some assistance.

Vocational Training Program

ICA is conducting a special, short-term, vocational training program intended to produce a corps of young men with technical skills to overcome the shortage of workers in the administration of the HVA. Afghans are learning office management to staff the proposed HVA administrative organization; accounting, bookkeeping and typing for assuming clerical positions; surveying through working with field crews; and the duties of shop foremen and the skills of automobile and tractor mechanics, through an apprenticeship program in the shops of the ACU at Chah-i-Anjir. Training of crews for conducting malaria campaigns is proposed. The ICA supplies the services of a director, the necessary supplies and equipment, including an electric generator, motor vehicles, electrical apparatus and office machines required for training students and operating the project. No local school is in existence to meet this problem. The HVA is responsible for the training project and provides the necessary class rooms. It will provide a director as soon as practicable.

Training Abroad

Individual technical assistance projects of the ICA program include funds to provide training of young Afghans abroad in order to increase the availability of trained personnel for the HVA. Selected graduates of the secondary technical schools at Kabul, who have served with the HVA, are given scholarships to receive advanced training at the American University of Beirut. To enable these candidates to become more proficient in their English, the ICA training project is providing intensive drill in the English language.

HVA has recently requested ICA to grant training awards to 38 young Afghans for overseas training in preparation for key administrative and technical positions in Education, Public Administration, Engineering, Rural Development and Agriculture. Twenty-six are to receive four-year college courses, five to re-

ceive two-year technical training courses, and four to study for six months. The remaining three are to make special studies in India. In addition it has been requested that eight HVA trainees attending college during the 1955-56 scholastic year in the United States be given a three-year extension of their training period.

The HVA request for training awards is based on the urgent need of college-trained men to take posts with the HVA, and the existing practice of the Government to assign the recipients of government-financed college training to positions in Kabul rather than in the Helmand Valley. HVA estimates it will eventually require 160 college men on its staff to carry out its plans for developing the Valley region. The new colleges or faculties of the University of Afghanistan are not prepared to provide training in all of the technical fields for which educational awards have been requested, nor can they undertake to supply the needed 30 to 40 of their first graduates for assignment to the Valley.

TRAINING IN AMERICA. Overseas training in American schools or colleges is believed to give Afghan students a number of special advantages which are considered to be of extreme value to the HVA in building up a competent staff. Returning students from the United States have learned principles of objectivity, exactness and integrity as part of their discipline in American scientific training, and have been imbued with dedication to their work, a willingness to undertake manual labor, and a democratic orientation that are not yet to be obtained from an educational experience in their own country. Afghan leaders also emphasize the leadership qualities which their young men develop through associations on American campuses and their experiences in practical work with American professional persons and organizations.

On the other hand, some of the graduates of American college four-year courses are experiencing some difficulty in adjusting to the prevailing low pay scale in Afghanistan, even though the regular rates of pay have been increased for service in the Helmand Valley. After receiving expenses for study in America and living by American standards, graduates placed in Kabul experience particular difficulty in their adjustment because of higher living costs there and also because of the differences in their points of view as compared with those of many of their associates and superiors. Several have found it very difficult to be content when assigned to positions which do not utilize their training or which involve cumbersome administrative procedures.

These difficulties, however, should not prejudice the continuation of any program for four-year education at foreign universities for many young Afghans. The problem of readaption is universal among students of the Middle East returning from an education experience in the western world. It will be eased somewhat as more and more students return and private employers find it to their advantage to give them greater opportunities and recognition.

TRAINING TO DATE. The request for a relatively large number of awards for technical training is in keeping with Afghanistan's efforts for several years to send young men abroad for higher education. A "Roster of Specialized Afghan

Personnel Who Have Studied or Are Studying Abroad in Recent Years," issued by UNESCO, July 1, 1956, reports the number of Afghans who have been to the United States or are now there under various auspices for technical or professional training. The roster covers those who left Afghanistan between 1947 and 1956, but does not pretend to be complete. It is summarized in the following table.

AFGHANS TRAINED IN THE UNITED STATES

Sponsor	*Number*	
Afghan Government, Banks and Private Industry	110	
Self Sponsored	36	
Total Afghanistan		146
UN and UN Agencies	11	
Total United Nations		11
United States—ICA	76	
United States—Information Service	8	
Total United States		84
TOTAL		241

In addition to the above, ICA has sent or will send 66 trainees in 1955 and 1956 to the American University of Beirut for special one-year courses in technical fields.

SUGGESTED REAPPRAISAL. The training program of the ICA meets one of Afghanistan's greatest needs in the expansion of its governmental services and the long-term development of the HVA. The present emphasis on education and training is justified and could unquestionably be expanded, but the phasing and duration of training outside of the country requires careful reexamination. As previously observed, HVA is now understaffed and ICA technicians have few English-speaking counterparts because of the number of young men who are being sent at the same time to the United States and Beirut. To offset this temporary shortage in part, practical and intensive group training in Agriculture and Public Administration might well be given by ICA technicians in the Helmand Valley.

In terms of the long-range program, it should be noted that, for most foreign students from the Middle East and South Asia, two years has proven to be the optimum period for technical training abroad in view of the required adjustment to foreign conditions and language, and also to meet the problem of readjustment on return home. American colleges are usually not adapted to provide complete courses on a two-year basis, and after only two years of training cannot give degrees or certificates of achievement which are necessary at home for

evidence of the fulfillment of a training award and advances in position and salary. Greater thought could well be given to more training in countries in the Middle East or South Asia where such courses as the operation and maintenance of irrigation canals, community development services, and agricultural extension work have been well developed. American University of Beirut, the American University at Cairo and several universities and vocational institutions in India give training which is particularly adapted for application to the requirements of Afghanistan.

TRAINING OF WOMEN. The HVA request for ICA training awards includes two applications for women to study primary Education and Home Economics. In the UNESCO roster only two of the 241 Afghans who have been accepted for education in the United States are women. Under the prevailing system of seclusion of their sex in Afghanistan, an overseas education is almost entirely limited to married women. The Survey Team did not attempt a thorough investigation of the education of women because of its many complexities and the limitation of time. It was learned, however, through an ICA sponsored socio-economic survey, that leading men of many villages in the Helmand Valley would approve separate, elementary education for young girls. The requests of village women, indirectly reported to the Survey Team, for medical care and education in their homes about simple sanitation and methods of cooking suggests the receptivity which would be given to assistance offered by trained women workers. The Government of Afghanistan is already considering utilization of women in its future rural development program.

A resource for women trainees may be found in the wives of young men who are to be educated abroad. Joint scholarships could be given for training of wives of trainees in primary school teaching, public health education and home economics.

Recommendations on Education Program

PRIMARY TEACHER TRAINING. The outstanding need for establishing a school system in the villages of the Helmand Valley is a corps of trained primary teachers, speaking the Pushtu language. *It is recommended that a primary teacher training institution be established at Kandahar or Lashkar Gah to meet this need.* Reasons could be given for the location of this institution at either of these places. The availability of buildings in Kandahar, the existence of seven elementary schools for practice teaching and, most important, the resource of young people who have completed the sixth grade, recommend Kandahar as the logical location. Later on, when a new institution with student dormitories can be built and after primary schools are established in villages of the Helmand Valley, the training school might be transferred to Lashkar Gah. This location would have the advantage of drawing more easily upon local village young men and women to become teachers and would permit the faculty to give professional support and refresher courses in the village schools.

EQUIPMENT. *Educational equipment for demonstration, which could be placed in the primary teacher training center, and in village schools of the Valley, should be provided by ICA to fulfill a great need for the effective impact it would make upon the general population.*

VOCATIONAL TRAINING. The program of training skilled workers at various centers in the Valley is recognized as meeting an emergency and has been set up as a temporary activity, without a staff of trained instructors, equipment or buildings. It has been successful in providing a number of trained employees but its effectiveness has been limited in some cases by the placement of the trainees in positions which do not utilize their new skills. A second limitation, resulting from the brevity of the training period, has been the lack of mastery of sufficient theory.

Since the demand for skilled workers and office and shop managers will undoubtedly continue in the administration of the Helmand Valley and in the industries of Kandahar, *it is recommended that consideration be given to the establishment of an adequately equipped and staffed vocational school in the Helmand Valley.* As long as the present urgent demand for skilled workers continues, short courses could be provided until graduates from the school can supply the needs. If the reported plan of the Ministry of Education to establish a technical high school in Kandahar with UNESCO technical assistance becomes an actuality, it is suggested that ICA lend its support to the development of this school, if this is requested, and transfer to it its present training project. MKA has offered its shops at Manzel Bagh for training automobile mechanics, welders, carpenters, electricians, and machine operators. Obviously, this opportunity of profiting by the long experience of MKA in training its own Afghan employees should be utilized in an intensive training program since it will provide practical work for boys from the vocational high school.

EDUCATIONAL TRAINING ABROAD. *It is recommended that four-year training of young Afghans especially in the fields of Civil and Electrical Engineering, Agricultural Engineering, Agronomy, Education, and other fields in which the HVA has particular need for well-trained specialists, be supported by technical assistance and an educational foundation program.*

Further consideration should be given to two-year training in third countries where technical education has been developed for conditions prevailing in Middle East countries. In view of the personal adjustment to be made both overseas and on return, and the need for more intensive technical education than can be gained in one year, two-year rather than one-year training is strongly urged.

Opportunities for training of married couples in the same or related fields should be offered to provide advanced education for women in Education, Public Health Education and Nursing, and Home Economics.

The intensive training of small groups of graduates of the Vocational Agriculture School and Afghan Institute of Technology now employed on the HVA staff to be given by advisers of the ICA is recommended in place of six-month training programs abroad.

It is specifically recommended that at least one award requested for training in Rural Development be given for study in the social sciences at either American University at Cairo or a U. S. university which offers special courses for preparing leaders for overseas community development programs.

Industrial management and business administration training for young men needed to assist in the industrial development of Kandahar could be advantageously sponsored to advance a well balanced industrial development in the Helmand Valley.

RURAL DEVELOPMENT PROGRAM

Problems of the People

The construction work and land development in the Valley require an accompanying technical and educational development of the people if they are to realize the full benefit of their improved resources and make a contribution to the payment of the costs of construction and maintenance. As already pointed out, the people of the Valley face four basic problems: (1) the inefficient and unscientific methods of handling their soil and water; (2) a crude technical development of agricultural tools; (3) poor health which, in addition to causing a high mortality and prolonged suffering, restricts their productive capacity; and (4) illiteracy which contributes to the static character of their way of life and a marginal subsistence economy, and to retardation in accepting new ideas and concepts associated with social and economic progress. These difficulties are compounded in the Nad-i-Ali and Marja projects by the problem of the nomads in adapting to a sedentary life and attempting to farm on irrigated bench lands where a high water table and excessive salinity of the soil restrict the possibility of profitable crop production to only a fraction of the total acreage. Many of the people in these projects now need to learn the techniques of raising sheep on irrigated pastures and other forms of earning a livelihood.

In the tenancy situation of the valleys of the Helmand and Arghandab Rivers, where land owners receive from one-half to four-fifths of the crops, the resolution of the agricultural problems will bring only small benefit to the great majority of farmers. Before a conclusion can be reached as to the best means to be adopted for improving the earnings, health, and education of the tenant farmers, it will be necessary to obtain accurate knowledge of the present system of land tenure, the relationships of small farmers and tenants to large land owners, the system of sharing crops, and the income of the different classes of the farm population. Present land ownership boundaries should be determined by cadastral surveys, following which a thorough study of land utilization and the social system which are tied into the pattern of land ownership will be needed.

Principles of Rural Development

To assist the people in resolving their basic problems, the HVA has committed

itself to a program of rural development and, as the first step, has established a center for the training of village-level workers in the fundamentals of several technical fields. It is now ready to start the program among the settled nomads. The technique of using "multi-purpose" workers, for bringing economic and social development to farm populations suffering from impoverishment and limited opportunities, implies certain basic assumptions and procedures. As these underlie the planning and organization of a sound rural development program, they are stated briefly in the following paragraphs.

Rural development envisages the enrichment of the way of life of a people by the promotion of various activities and new methods, by the stimulation and encouragement of communities to increase their food supply, by improvement of education and health and sanitary conditions, by the construction of better houses and villages, and by the development of small industries, credit and other facilities. It necessarily changes the ways in which people have traditionally exploited their resources to gain a living as well as the traditional forms of their society. It differs from direct technical assistance, considered as the instruction of people, in that it motivates the active participation of communities in discussion of their own needs and problems and in self-initiated actions to find means of resolving them. Outside assistance is drawn upon only as technical information and supplementary material aid are required.

It is essential that the leaders of a rural development program begin with an understanding of the technology, social institutions and patterns for carrying on life of the participating people. After achieving an insight into the economic and social backgrounds, the successive procedures are: leading the community to consider and define its needs, organizing the community to act, planning to take some action, bringing the leaders together with available technical advisers, and carrying out the program. Periodic evaluation should be made of the degree to which expressed needs have been met and changes have come to the community.

The Current Program

The Rural Development Department of the HVA has not yet been formally organized pending the appointment of a permanent director and the training of a corps of rural development workers by ICA. A Rural Development Council consisting of five HVA officials representing health, education and agriculture has, however, been appointed to give policy direction, with the help of five ICA advisers in Public Administration, Agriculture and Education.

In a plan submitted in November 1955, the ICA, proposed the establishment of a broad rural development program to be carried out by a line and staff organization, in which an Office of Operations would administer the rural development and land development services, and an Office of Staff Services would administer the technical divisions providing support to rural development workers. An ICA Rural Development Adviser, a Training Adviser, and advisers in specialized technical fields are to assist this organization.

As now planned the Rural Development Department of HVA will be guided by a Rural Development Council receiving policy guidance from the Rural Development Commission at Kabul. The Council in the Helmand Valley is to be composed of representatives of the staff and operating divisions of HVA and the appropriate ICA advisers. Under a chief Rural Development Officer, subordinate officers will administer blocks of 80 to 120 villages. These Block Officers are to be recruited from the graduates of the Vocational Agriculture School at Kabul and the Training Center at Nad-i-Ali. Each Block Leader is to be assisted by specialists in agriculture, irrigation, health, and cottage industry. Village-level workers, trained in the fundamentals of agriculture, community sanitation, and adult education are to be assigned to from three to eight villages, depending upon size and extent of social and economic problems.

To start this program, ICA sent two of its Helmand Valley agricultural advisers, who had been operating a training center in health measures and agricultural extension, to India for a three-weeks' visit to study the principles and methods of a multi-purpose village work program. They also attended a community development work conference at Bangkok. To advise both ICA and HVA on the initiation of the program, the Near East Foundation sent its director of the Logar Valley Rural Development Project to the Valley for consultation. An Indian village development specialist was employed for a short period to advise on methodology.

Training Program

Under the specifications of the plan drafted in November 1955, the program was to begin in 1956 with the training of a group of young men for work in the villages. Young men with at least a sixth grade education were to be selected and given six months specialized training, "to render elemental services, to take care of many of the simpler technical needs of the villages." They were to be recruited from the old villages "as practically all of the new settlers are illiterate." The workers being village men, it was assumed they "would be aware of any existing services and wide-spread technical needs," and "would serve as representatives of all technical services and refer complex technical problems to specialists at the Block Center." The established procedures are "to be repeatable in each community and expanded throughout the region."

Current ICA activity is now implementing this rural development program through the training of the village-level workers at the Nad-i-Ali Training Center. Since a survey of the established villages discovered only three young men who could read and write, educational background was necessarily disregarded and 26 young men showing interest and aptitude were recruited from both the new and older villages. In field demonstrations, these men have proved effective because of their intimate acquaintance with local customs and language, but their ability without an adequate education to become practical advisers to their communities remains to be tested.

The ICA Adviser in Agricultural Extension has been designated as the acting co-director of the Rural Development Training Center but the organized Rural Development Council has ceased to function as an advisory board pending the inauguration of a full-scale rural development program. As of August 31, 1956, the 26 young village men had completed six months of training at the Center at Nad-i-Ali and were awaiting assignments. Thirteen graduates of the Vocational Agricultural School, some of whom had received training at the Center and are presently employed in a crop production program, are also available for the Rural Development Program.

Evaluation

NEED FOR DEFINING OBJECTIVES. Some members of the HVA staff and of the ICA staff both at Kabul and in the Helmand Valley tend to regard rural development as merely an integration of technical assistance services to villages. A division of thought also exists in ICA as to whether or not technical advisers in specialized fields should be component parts of the Rural Development Division at all. This confusion arises in part from a feeling that rural development is competitive with, or a substitute for, assistance in individual technical fields. In some quarters, it is also considered that rural development is a device for administering the villages as, for example, in the suggestion that the division include eventually those services now administered by the provincial governments.

The concept of rural development is unclear and undefined and tends to over-emphasize the particular function of providing technical assistance at the village level. The program as now planned fails to take into full consideration the primary and underlying purpose of rural development as being the encouragement of communities to resolve their basic social and economic problems, through their own concerted action.

NEED FOR SOCIO-ECONOMIC DATA. Although socio-economic studies to assess the farm production problems and technical needs of the farmers in the established villages have been attempted, the field work done by untrained and unsupervised young men was not satisfactory. A full tabulation of the data has not been completed. In the Helmand Valley, the problems of understanding the local culture is complicated by the presence of both sedentary agricultural and pastoral nomadic peoples. A full knowledge of the patterns of their farming methods, land tenure and tenancy and village and tribal organization is essential before activities that may radically change them are attempted.

NEED OF ADVISER. A major difficulty lies in the lack of an experienced rural development adviser on the ICA staff. It has been perhaps an unfair imposition to expect present personnel, unacquainted with the principles and procedures of community development, to gain an adequate mastery of the required techniques, after only three weeks of observation in another country. In the absence of previous experience on the part of the ICA staff and without a clear-cut definition of the nature and objectives of rural community development, it is not sur-

prising that the training of village-level workers and the program in general should have certain shortcomings. The program so far has been limited to teaching trainees basic agricultural technology and elemental health and sanitation concepts but has not introduced adequately the teaching of methods of community organization, the stimulation of leadership and the required approaches to initiating community action. The curriculum still overstresses working with individual families.

TRAINING METHODS. The teaching of improved agricultural methods suffers from inadequate facilities at the present Training Center and improvised teaching methods and materials. The Center is located in the Nad-i-Ali area on Class IV land which cannot support demonstrations of successful farm operation. All of the garden land at the Center was fertilized prior to the arrival of the students which made it impossible for them to learn the relative values of fertilized and unfertilized soils. The practice of sending pairs of boys into the villages for two or three weeks of experience in working with farm families, while desirable, has resulted in the neglect of their own garden plots and the loss of the experience to be gained through consistent and successful cultivation. Continuation of the required three hours of manual labor, originally introduced to inculcate the value of work among boys reared to look down upon manual work, does not now apply to boys drawn from hard-working village families. Visits by trainees, as part of their educational program, at the ICA projects for livestock breeding and experimental farming, which are still in the process of achieving success under Afghan conditions, require careful evaluation and explanation of the problems being faced. The successful ICA horticulture project directed principally to producing vegetables for foreign people employed in the Valley has not yet been sufficiently related to the training program. The presently contemplated plan to move the Training Center to a location with better soil and housing facilities and adjacent to new experimental projects is commendable. An improvement in the quality and methods of instruction is of equal importance.

The Training Center is currently at its lowest point in effectiveness due largely to the difficulties of training young men who speak only the Pushtu language and have a minimum of formal education. The communication of information is complicated by the necessity of translating all lessons prepared by ICA personnel into Farsi and then for an instructor to translate these into Pushtu. The present instructor is teaching conscientiously but, being trained as a sanitarian and with only a limited acquaintance with the subject of agriculture, is unable to provide an adequate standard of instruction.

NEED FOR PLAN. The present situation at the Training Center at Nad-i-Ali points to the need for reorganization through review of its strengths and weaknesses and more specific planning for the over-all training of multi-purpose village-level workers. A clear definition of the objectives and methods of rural development to be pursued is the first requirement. It should be recognized that rural or community development through the use of multi-purpose village-level workers

c. The maintenance program should provide for the draining of the main canals for a brief period each winter to aid in the removal of silt deposits and the repair of caving banks, erosion below structures, and damage to the parts of head walls, gate structures and concrete aprons which are normally submerged.

d. The maintenance program for other parts of the year should include removal of moss and water grass, repair of canal banks and the roads thereon, the quarrying and hauling of necessary rip-rap, and general maintenance of structures and mechanical equipment.

e. The places where the Helmand River is cutting in toward the Shamalan Canal should be carefully watched and should be protected by rip-rap if the river does not soon stabilize its channel.

f. MKA should be directed to proceed at once with a survey of the existing private irrigation systems in the Arghandab areas to serve as a basis for devising methods of distributing water equitably and avoiding waste. This survey will also be of value later in determining the amount of water that can be made available to the Tarnak area. (Chapter II)

g. The Arghandab and Kajakai reservoirs should be stocked with edible fish.

h. No serious emergency threatens the effective operation of the irrigation system and no contract with a foreign firm for carrying on the operation and maintenance appears necessary. It is recommended that one American irrigation engineer be provided by ICA to advise HVA.

i. After completion of the proposed Phase I construction and survey program, it is recommended that future engineering work be performed by a concern which does not engage also in the construction business. (Chapter X)

15. RURAL DEVELOPMENT. (Chapter VII)

a. It is recommended that the future settlement of nomad peoples in the Valley be made by tribal groups rather than by enforced intermingling.

b. The training and placement of Afghan assistant medical officers, male nurses, and sanitarians should be carried forward to provide health services for the people of the Valley.

c. A hospital with training center for Afghan assistant medical officers, nurses, and sanitarians should be constructed at Lashkar Gah.

d. Assistance should be given to the establishment of a primary teacher training institute at Kandahar.

e. ICA should provide demonstration equipment and materials for village schools of the Helmand Valley as their construction is completed.

f. Assistance should be given to the establishment of a vocational training center at Kandahar under either UNESCO or HVA auspices.

is a recently created process, originated in, and adapted to the needs of, the countries of the Middle and Far East. American experiences in this field are relatively brief, except for the work of the Near East Foundation, and professional training in community development as it is practiced in foreign countries is negligible. Present overseas training of young Afghan men cannot be expected to prepare them fully to teach in, or to administer, a rural development program. It will be incumbent upon ICA and HVA to develop an indigenous rural development plan with organization and training adapted to the particular needs and society of Afghanistan.

Recommendations on Rural Development Program

STAFF AND ADVISERS. *To assist HVA in implementing the rural development program, it is recommended that ICA carry out its proposed recruitment of a Rural Development Adviser and assign him to the Helmand Valley.* This location should not preclude his participation in the activities of the Rural Development Commission in Kabul.

An Adviser of Social Economics should also be recruited to assist in preparing the necessary training materials on practices pertaining to agriculture, health and village life, land tenure and utilization, and the social structure of the peoples of the Helmand Valley, and also to serve as a consultant in the training work and the execution of the rural development program. He should be a specialist in the study of human cultures and community organization and as such should make the recommended analysis of the land tenure and tenancy systems of the Helmand and Arghandab Valleys, in company with an agronomist to advise on agriculture aspects. He should also provide the orientation of new technical assistance personnel in the rural culture of Afghanistan.

It is recommended that the official of HVA, who is to direct the rural development training program, and the ICA adviser and co-director of training, be sent to Iran for three months for special training and observation at the ICA-Near East Foundation training school for village-level workers.

TRAINING PROCEDURES. A need for more effective teaching methods is indicated. *It is recommended that a training and teaching materials committee be organized to expand the present curriculum into a complete teaching manual.* It is suggested that a specialist in educational methods and curricula from the Teachers College advisory group at Kabul be invited to participate in this work.

Instructors speaking both Pushtu and English should be given a full comprehension of their subject matter and trained in methods of discussion and the relating of practice work to theory before they assume the responsibilities of teaching.

A full-time head instructor of training, selected from among the young men trained in rural development at the American University of Beirut, should be appointed. Afghan instructors in community organization, agricultural extension, sanitary engineering, and home and village construction should be recruited from the HVA staff to teach on a part-time basis.

TRAINING CENTER. *The operation of the Training Center at Nad-i-Ali should be discontinued* until the curriculum has been written to give instruction in rural development as a community-centered program, and until a full complement of teachers has been appointed and the directors have been given special training in Iran. *The Center should be relocated as soon as possible* on land with soils capable of sustained and satisfactory agricultural production. *It is recommended that the Training Center be coordinated with the community rural development center proposed below.* As a method of teaching trainees the principles and methods of building construction, they should participate in the construction of their new dormitories at this center, made of the same materials as are available in the villages.

RURAL DEVELOPMENT CENTER. *A community center should be constructed in the Shamalan project,* following plans made for similar institutions by the Rural Development Commission at Kabul. It should provide meeting rooms, an equipped handicraft shop, and classrooms for the new training center.

RURAL DEVELOPMENT DIVISION. To carry forward the plan that has been energetically pursued in the last nine months, *it is recommended that the functioning of the Rural Development Division of the HVA be inaugurated among the families to be settled in the Marja project.* The 26 students of the present training center should be assigned to community work in organizing the tribal villages and assisting the settlers in planting and irrigating their first crops and building their new homes. This work should be regarded as an intensive field-training activity for the students as well as an assistance to the settlers. The village-level workers should be called together frequently to talk over their problems and the methods adopted for resolving them. Former graduates of the Vocational Agriculture School and the Training Center are available for assignment as block leaders of groups of village-level workers. *The ICA Rural Development Adviser should share in the supervision of this program* and give guidance to the HVA director who, it is planned, is to be selected from a group of recently returned American university graduates in agriculture. After the training experience on the Marja project, a number of the village-level workers can be assigned to other communities. As the Rural Development Training Center graduates future classes, the program can be gradually extended to all sections of the Helmand Valley.

AGRICULTURAL EXTENSION SPECIALISTS. A number of agricultural extension workers of the HVA, not required in the proposed Marja rural development program and employed during the summer of 1956 in a crop production program, are available for an intensive agricultural extension program in a few communities. These workers are now scattered in various villages in the Shamalan, Seraj, North Arghandab, and Nad-i-Ali projects. *It is recommended that they be placed in the Nad-i-Ali and Shamalan projects and assigned to the ICA Adviser in Vocational Agriculture, for supervision and direction in the introduction of improved agri-*

cultural techniques and equipment. It is strongly believed that the founding of a 4-H Club program by this group of workers for the boys of the Helmand Valley would provide an effective and additional means of introducing new agricultural methods and crops into farm communities and would also train boys in group activities for future leadership in the progress of their communities. *At a later date, these extension workers should attend the Training Center for courses in community development work and become agricultural specialists in the Rural Development Program.*

CADASTRAL SURVEYS

Cadastral surveys are now in progress in the Shamalan and Arghandab areas and should be extended to other areas as rapidly as possible. Accurate knowledge of private land ownership underlies the planning of all settlement on the land remaining in government possession. In order to restrain the present tendency of established land owners to acquire unused land by merely extending ditches and applying the water now made available by the irrigation project, government land ownership must be immediately established, since such acquisitions naturally reduce the amount of new land available to settlers. It is of equal importance that the cadastral surveys be completed to serve as a basis for instituting a satisfactory land and water tax system for the collection of construction and operation charges.

Recommendations

Because accurate data on land ownership is an important factor socially, politically, and economically, and especially in terms of generating additional returns from new lands for the government, *it is recommended that the cadastral surveys be expedited on an emergency basis using as many foreign surveyors, draftsmen and computers as may be necessary to finish the work in four years' time.* All work in the field should be under the control of Afghans and all necessary arrangements with interested property owners should be made by accredited Afghan officials. The surveys might cost about $900,000 in all currencies, including $400,000 in dollars.

FARM CREDIT

The only credit now available to settlers is that offered by the HVA for the cost of their land and their house or housing materials, their farming equipment and livestock, and the seed with which they plant their first crops. HVA is not presently authorized or prepared to advance additional credit from its own resources to settlers or to landless farmers. For small farmers who cultivate land of others under contract, and for farm tenants, no credit facilities exist, except those of the private money lenders, whose interest charges are exorbitant, occasionally reaching the rate of 45 percent.

Only farmers who own land can obtain loans from the Agricultural and Industries Bank. The Kandahar branch of this bank has extended loans in the sum

of over 3.5 million afghanis to landed farmers in the Valley. Conforming with the terms of its charter, these loans have primarily been made for land improvement, and, to a lesser extent, for the purchase of livestock. A few mortgage loans, secured by farm lands, have been made to permit farmers to repay loans received from money lenders and to refinance themselves at the more reasonable interest rates of the bank. The bank also makes investments in, and loans to, hand-operated industries, but these activities have so far been confined to the central bank at Kabul. The services and facilities of the bank to date have been extremely limited both as to the amount of funds made available and as to the type of loan which it is prepared to make. The bank is not in a position, for example, to make loans which would enable a farmer to hold his commodities until he can obtain the most favorable price. It is also not in a position to extend credit for the purchase of fertilizer or to provide the foreign exchange for its importation by farmers grouped together for this purpose. On the other hand, the bank will loan money to cooperatives and make purchases of foreign equipment and materials for them.

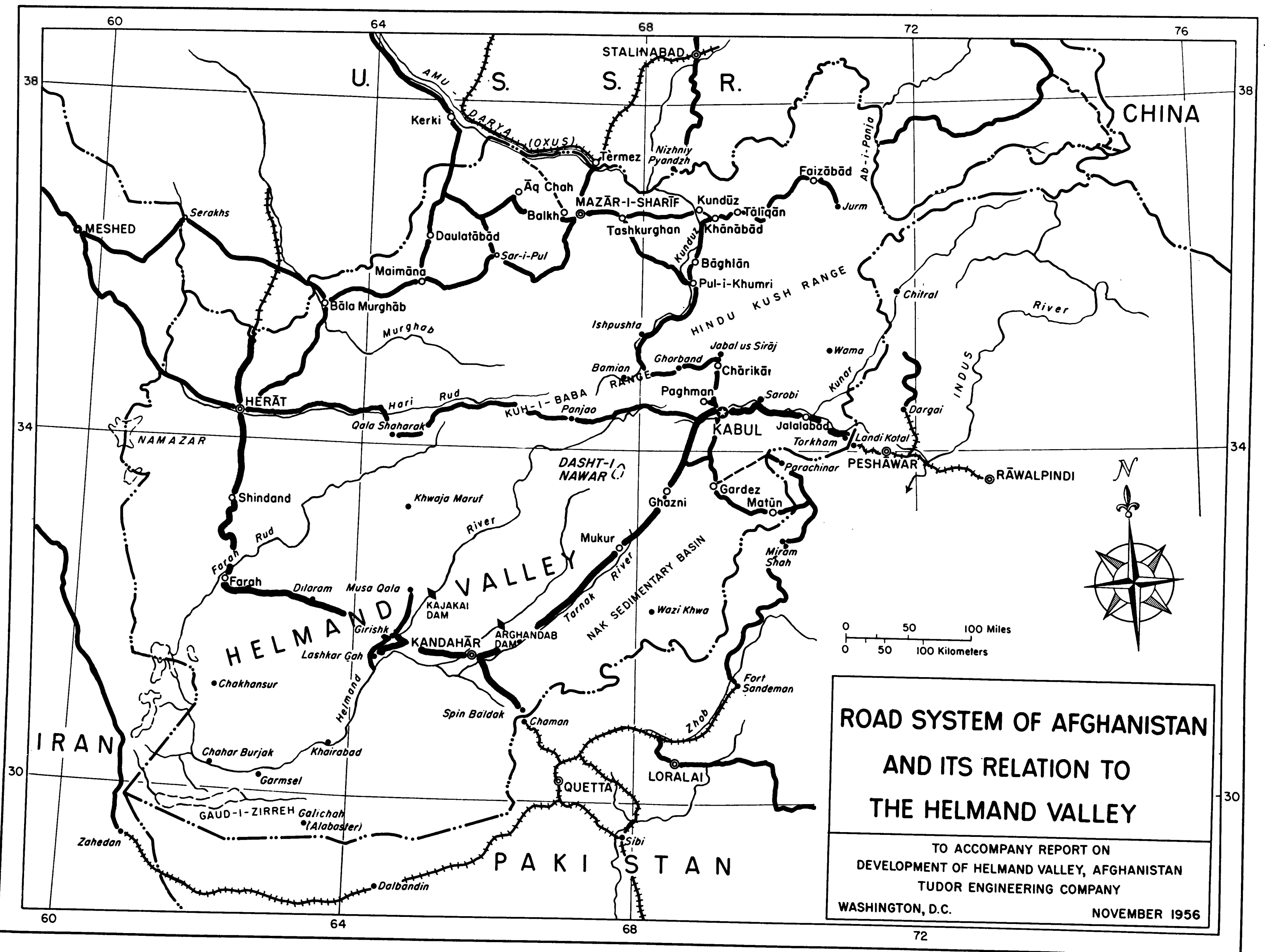
Although branches of the Da Afghanistan Bank and Bank-i-Mille are also in Kandahar, they advance no credit which directly helps the development of agriculture in the Helmand Valley. Their loans to merchants to finance marketing and processing of agricultural commodities help agriculture only indirectly. There is no branch of the Construction and Loan Bank in Kandahar.

Under these circumstances small farmers are in a very difficult position to obtain credit if they are to make the shifts in their farm economy and improve their farming techniques and handicraft, as recommended in this report. They may, in the near future, require credit to obtain improved farm machinery, seed for pasture grasses and sugar beet planting, fertilizers, and the raw materials and basic equipment for cottage crafts. It is believed that the further entry of HVA into the credit field with cash advances to meet these requirements is inadvisable but HVA does have an established facility for making loans in kind.

Recommendations on Credit

It is recommended that the HVA obtain, if possible, a single long-term loan and utilize the proceeds to make large purchases of the articles and materials required by settlers and small farmers for farm improvement and development of handicrafts. Loans in kind could then be made to individual farmers, based on the record of their industriousness, and repayment would be collected as other loans are being collected by the HVA. The specific need for credit for handicrafts is discussed in Chapter VIII.

It is also recommended that a program for the operation of cooperatives be established as part of the rural development program of the HVA. As groups of farmers learn the necessary management procedures, they can take over the business of making small loans. The same cooperatives could undertake group purchasing and marketing of farm supplies and commodities for their memberships.



ROAD SYSTEM OF AFGHANISTAN
AND ITS RELATION TO
THE HELMAND VALLEY
TO ACCOMPANY REPORT ON
DEVELOPMENT OF HELMAND VALLEY, AFGHANISTAN
TUDOR ENGINEERING COMPANY
WASHINGTON, D.C.
NOVEMBER 1956
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MAZĀR-I-SHARĪF
Kundūz
Tāliqān
Balkh
Tashkurghan
Khānābād
MESHED
Serakhs
Daulatābād
Sar-i-Pul
Kunduz
Bāghlān
Maimāna
Pul-i-Khumri
Bāla Murghāb
HINDU KUSH RANGE
Chitral
River
Ishpushta
Murghab
Jabal us Sirāj
Wama
Ghorband
INDUS
Bamian
Chārikār
Kunar
RANGE
Paghman
Sarobi
HERĀT
Hari Rud
KUH-I-BABA
Dargai
Panjao
Qala Shaharak
Jalalabad
KABUL
Landi Kotal
NAMAZAR
Torkham
PESHAWAR
Parachinar
RĀWALPINDI
DASHT-I-NAWAR
Shindand
Khwaja Maruf
Ghazni
Gardez
Matūn
River
Farah Rud
Mukur
Miram Shah
VALLEY
Farah
Dilaram
Musa Qala
Tarnak River
NAK SEDIMENTARY BASIN
KAJAKAI DAM
Wazi Khwa
Girishk
KANDAHĀR
ARGHANDAB DAM
HELMAND
Lashkar Gah
Chakhansur
Fort Sandeman
Helmand
Spin Baldak
Chaman
Zhob
Chahar Burjak
Khairabad
LORALAI
Garmsel
QUETTA
GAUD-I-ZIRREH
Galichah (Alabaster)
Zahedan
Sibi
Dalbandin
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Plate VI

Chapter VIII
INDUSTRY, POWER AND TRANSPORTATION

GENERAL BACKGROUND

Present Stage of Development

While agriculture will continue to dominate the economy of the Helmand Valley for many years to come, increased agricultural output should be accompanied by progressive industrial development and improved transport. Without such development, there can be only a limited increase in living standards within the Valley and an inadequate contribution by the Valley to the economy of the nation as a whole.

At present, industry is still very largely in the handicraft stage, and even handicraft potentials are not being utilized as fully and effectively as they might be. There are only two real factories (the Kandahar Woolen Mill and the Pushtoon Industries) in the entire region, both located in Kandahar, and neither is being operated efficiently. In the same city, a few small-scale mechanized shops are just being started. Electric power is commercially available only in the Kandahar area. Capacity is inadequate and unreliable, resulting in frequent interruptions in the few industrial operations that have been introduced. Fuel is very scarce. On the credit side, communications within the area are probably better than in any other region of comparable size in Afghanistan. The roads from Kandahar west through Girishk and Lashkar Gah and thence to Nad-i-Ali and Marja are in good shape, as is the road south from Kandahar to the Pakistan gateway at Chaman. In contrast, communications between the Valley and the rest of Afghanistan—north to Kabul and west to Farah and Herat—are bad, especially the latter. Moreover, with the exception of a limited number of trucks and buses, wheeled transport is almost entirely lacking, despite the relatively good main roads in the area. Only one single animal-drawn cart was observed in the Kandahar region. Goods move principally on the backs of camels and donkeys.

This absence of any significant industrial development cannot be attributed primarily to the lack of capital funds for investment. There is. however, no industrial tradition in the area, no experience in the management of substantial industrial enterprise, and no clear notion on the part of those with capital as to the kinds of enterprise in which investment is likely to be profitable. There is also a lack of mechanical skills, but this seems to be less of a problem. The operations of MKA have produced a substantial number of trained mechanics and have demonstrated a considerable learning aptitude on the part of the Afghan worker.

Resources and Resource Limitations

The pattern of industrial development in the Helmand area must be conditioned, in the first place, by the availability of resources—material, financial and

human. This does not mean, of course, that these resources are to be regarded as static. The process of development will itself provide new resources which will, in turn, constitute the basis for still further development.

RAW MATERIALS—AGRICULTURAL. The principal source of raw materials is agriculture. The most important product is fruit, grown primarily in the Arghandab Valley. Wool, wheat, and hides are the other major products of Valley agriculture. The output of all of these will increase as new land becomes available and as presently developed land is cultivated more intensively. All can form the basis for substantial processing industries. None are now being utilized with anything approaching tolerable efficiency.

Cotton is also produced but, at present, in quantities too small to permit industrial use within the Valley. Output in 1955-56 was about 150 tons of seed cotton in the Lashkar Gah area, plus about 20 tons in the Kandahar region. Production could be expanded substantially. The soil in the new developments is also suitable for sugar beets, though none are now grown in the area.

MINERALS AND FUEL. As regards minerals, considerable further exploration is needed to determine the area's potential. Clay for ceramics of all kinds is available in abundance. There is ample marble near Khugiani (halfway between Kandahar and Lashkar Gah) and alabaster near Galichah in the Malik Dokand area, south of Khairabad (see Plate VI), though the latter involves serious transportation difficulties. There also appear to be substantial salt deposits. All of these resources are susceptible of industrial development.

No coal is available in the area, and presently known deposits in Afghanistan and Pakistan are too distant to constitute economic sources. There is no domestic petroleum as yet. Diesel and fuel oil can be imported only by the Government Monopolies Department, and imports of fuel oil have been very limited. As a result, the fuels used for industrial operations consist principally of camel thorn and very limited supplies of wood. Thus the wool plant, now operating at about 50 percent of capacity, uses about 3 kharwar, or slightly under 2 tons, of wood per day at a cost of about 100 to 120 afghanis per kharwar. The Pushtoon Company, similarly, uses wood for fuel. Smaller industries, such as pottery and brick kilns, rely on camel thorn. This lack of good fuel is likely to remain a very serious bottleneck, unless new sources are developed. Camel thorn is not a suitable fuel for factory use. Wood is far from satisfactory, and it is doubtful that the supply of wood, while apparently adequate at the present rate of consumption, can be increased enough to support any substantial industrial expansion. Fuel oil is a possibility but, unless petroleum is located within the country, it will be expensive and require considerable foreign exchange. In short, unless and until satisfactory new fuel sources are made available, the development of industries requiring large quantities of fuel, such as cement or glass manufacture, does not seem practical.

MANPOWER. Unskilled labor will certainly be available as needed, particu-

larly as more efficient methods reduce manpower needs in existing occupations. The supply of skilled labor is very meager, but the experience of MKA indicates that Afghans learn new mechanical skills readily and can be trained to an acceptable level of efficiency. Higher technical skills are lacking, and it may be assumed that some foreign technicians will have to be imported during the initial phases of any major new enterprise. Part of the function of these technicians should be to train Afghan understudies to take their places.

Finance and Credit

There appears to be ample local capital, provided the incentives for its investment are sufficient. Credit facilities are also available although, in view of the low stage of industrial development, there has been little demand in the project area to date for any substantial volume of industrial credit. The Agricultural and Industrial Bank can extend credit to handicraft industry but has so far received no applications from the Helmand region. This bank is 51 percent government owned and has a capital of 150 million afghanis, of which 85 million has been subscribed. Loans to non-mechanized industry would ordinarily be granted for two to six years at 8 percent. In the case of a corporate enterprise, the loan would be secured by the corporation's assets. In the case of an individual or partnership, personal security plus independent indorsers would be required. The bank is prepared to finance cooperatives. It may also accept equity participation, subject to later repurchase, instead of granting a loan.

No comparable institution exists for either small- or large-scale mechanized industry, but an Industrial Bank with capital of 600 million afghanis is now being established under the sponsorship of Da Afghanistan Bank. It is expected that a majority of the stock of this bank will eventually be subscribed by non-government sources, such as Bank-i-Mille. This Industrial Bank also will be prepared to engage in equity as well as loan financing. Probable terms for industrial loans will be 10 years at 4 percent. Pending establishment of this bank, Da Afghanistan Bank has granted a few industrial loans.

In the past, Bank-i-Mille has itself been a primary source of industrial financing throughout Afghanistan and may continue to be an important source in the future. In general, however, Bank-i-Mille has preferred to operate on the basis of equity participation, rather than through loans, and to retain control of each enterprise until it regards it as ready to operate independently.

Up to the present, the development of ordinary commercial credit, such as the discounting of bills of exchange, has been hampered by the lack of a commercial code which would assure security to the lender. However, this lack has just been remedied, and such a code was approved by Parliament during the past summer.

Foreign exchange will, of course, be a consideration, but this is a problem of national rather than regional concern and is dealt with elsewhere in this report. Compared with other regions of Afghanistan, moreover, the foreign exchange

requirements for industrial development within the Valley will be fairly limited and, as pointed out below, much of the recommended investment will be of a nature that will either contribute to foreign exchange earnings or save foreign exchange expenditures.

Management, Ownership and Control

While adequate internal capital is thus likely to be available, the managerial skills required to insure the efficient and profitable use of this capital are scarce in Afghanistan and appear to be particularly lacking in the Valley. As described below, the two factories now in existence in southern Afghanistan both show almost complete lack of effective direction. In contrast, a number of the manufacturing enterprises in the Kabul area and in northern Afghanistan appear to be run very efficiently. All or most of these well-managed plants are associated with the Bank-i-Mille group which has, for various reasons, curtailed its operations in the past few years.

It is hoped that this limited supply of trained management available in Kabul and the north can be drawn upon to help direct industrial development in the Valley. However, there appears to be some reluctance on the part of the groups involved to move into southern Afghanistan at this time, and it is doubtful, in any event, whether the area's needs for experienced managers can be met from this source alone.

Under the circumstances, some importation of foreign management as well as foreign technical skills is probably essential. This can be accomplished in various ways, such as hiring individual managers, contracting for management services of a foreign firm, or by attracting foreign investment.

Employment of individual foreign managers would cost less than a management contract, but it would probably not be as satisfactory for larger enterprises. Management contracts would have additional advantages in the case of export industries, where the foreign connections of the management firm would prove useful. The training of Afghan personnel to take over management functions is also more likely to be effectively performed under a contract arrangement.

Foreign investment would provide not only management but also foreign exchange. Attracting such investment, however, would not be easy. Foreign risk capital would be interested in investing in Afghanistan only if the probable returns were very considerably greater than those available nearer home and would insist on explicit safeguards against government action that might impair the value of the investment. The Foreign Investment Act, promulgated by the government in April 1954, includes some such safeguards, relating primarily to equality of treatment with Afghan enterprise and to convertibility of earnings and capital. It does not, however, provide against expropriation or similar government action.

Some consideration should be given to exploring the possibility of joint ventures under which foreign interests would invest the foreign exchange required

and provide the management of an enterprise, while the Afghan Government or private interests would supply the local currency needed. This would be particularly appropriate in connection with mining or petroleum ventures, though it might also prove feasible for a major manufacturing plant, such as the nitrogen fertilizer project discussed later in this chapter in connection with Kajakai power. Additional attraction to foreign investment might be provided by granting some form of preference in the distribution of joint venture profits during the first few years of operation. Provision for ultimate purchase of the foreign interest on an agreed basis might also be included. This type of arrangement might reduce the apparent risks sufficiently to attract foreign investment and management.

Government Encouragement and Assistance

The preceding discussion assumes that, as in the past, the development of manufacturing industry will be largely carried through by private enterprise. In view of the special conditions in the Valley, however, there will be need for some government action to encourage and assist and, within limits, to guide the development of new industry. In a few instances, participation by government may be necessary either directly or through corporations, such as the Cotton Company in which it owns a controlling interest. It is recognized, also, that the government can and does exercise considerable influence over private business policy even where it does not have any direct financial interest.

In general the role of government should be to create the conditions which will encourage and facilitate such investment. Thus government, acting through the HVA, can take the steps necessary to insure production of an adequate supply of the raw materials needed. Government-controlled banks can provide financial assistance, through loans and, in appropriate cases, equity capital. Government agencies can undertake both technical and market research, to provide the information on which intelligent private investment can be based, and provide technical advice and assistance. Foreign exchange for original equipment, maintenance and operating supplies and raw materials must be readily available to the kinds of enterprise it seems desirable to encourage. In the case of government-controlled corporations, the General Electric Company should adjust its rate policy so as to encourage industrial development, the Cotton Company should provide needed ginning facilities, and the Monopolies Department should make available, on appropriate terms and in adequate quantities, the fuel and raw materials of which it is the exclusive importer. Government may also be able to facilitate the employment of foreign management and technicians by private industrial firms. This is likely to be highly essential to insure efficient operation. In the field of cottage industry, the government can facilitate and encourage the formation of cooperatives, including perhaps providing initial working capital.

Commodity Movement in and out of the Valley

Industrial development must be related to existing markets and marketing

g. The educational program for training Afghans abroad should be placed on a 4-year basis for the preparation of highly trained technical specialists and on a 2-year basis for other specialists. Greater use should be made of training facilities in the Middle East and South Asia.

h. The operation of the present Rural Development Training Center at Nad-i-Ali should be discontinued until a better curriculum and better educational methods can be developed. The co-directors of the training center should be sent to the ICA-NEF Rural Development School in Iran for special training.

i. A general rural development center should be constructed in the Shamalan area in accordance with general plans prepared by the Rural Development Commission of Afghanistan. Facilities should be provided to accommodate the training center now operating at Nad-i-Ali.

j. The agricultural extension specialists of the HVA should be assigned first to the Marja and Shamalan areas for a special agricultural and 4-H program and should be given subsequent training to equip them as agricultural specialists to advise block leaders.

k. Cadastral surveys should be conducted in the Helmand Valley to determine land ownerships and to provide the necessary information for establishing a land and irrigation tax system. Several survey teams, employing foreigners in part, should be organized and their field work directed by Afghans.

l. A credit system should be established for farmers and handicraft workers through HVA. Loans should be made and repaid in kind. Funds for purchasing stocks of equipment and materials should be obtained by the HVA from one of the established banks.

16. INDUSTRY AND POWER. (Chapter VIII)

a. It is recommended that, upon installation of new generating facilities, consideration be given to reducing rates for industrial power in the Kandahar area with a view to encouraging the expansion of industry.

b. Industrial development should include an augmentation of the cotton ginning process, correlated with an increase in cotton production in the Valley. More mechanized industries should be introduced in Kandahar.

c. Handicrafts should be developed throughout the villages of the Valley. To accomplish this, it will be necessary to provide tools and teach improved techniques by providing ICA handicraft specialists.

17. MINERALS AND PETROLEUM. Mineral prospecting regulations should be clarified by the Government of Afghanistan so as to encourage the individual prospector in efforts to discover new mineral resources. It is recommended that the Government of Afghanistan consider establishing incentives for foreign private oil exploration in the country. If the government clearly expresses its desire to attract foreign investment in this field, ICA should assist by endeavoring to

practices. No accurate statistics are available showing the nature and volume of the trade of the Valley with other parts of Afghanistan and with foreign countries. Some information can, however, be pieced together from a number of sources, particularly the records of the Kandahar Customs House and the traffic survey conducted by MKA in 1952-53. Unfortunately, both of these sources contain ambiguities. Kandahar Customs House records include imports for and exports from other parts of Afghanistan and the same is true of traffic over the Kandahar-Spin Baldak highway. Similarly, only part of the goods movement along the Kandahar-Kabul road originates in or is destined for the Valley.

Despite these reservations, some information of value can be obtained. It is clear that the principal products, of which the Valley produces a substantial surplus over its present needs, are dried and fresh fruit, wool, spices (particularly anise), hides and skins, and animal casings.

The bulk of the shipments of all these commodities out of the Valley is over the Spin Baldak road to Chaman for export. In 1955-56, dried fruit represented about 65 percent and wool about 25 percent of the afghani value of all exports through Kandahar. Moreover, dried fruit shipments out of Kandahar amounted to about 70 percent of the total for all of Afghanistan, while wool shipments out of Kandahar were about 50 percent of the national total. These figures indicate the importance of the Valley as a producer of these items though, as noted above, part of the Kandahar exports may be assumed to originate in other parts of the country.

As regards shipments into the Valley, the most important commodity imported through the Kandahar Customs House is cloth, particularly cotton. During 1955-56, total imports through Kandahar were valued at 432 million afghanis. Imports of cotton cloth were valued at 224 million afghanis, or more than half the total. Rayon cloth imports were next at 79 million afghanis. Following in order of importance were tea (48 million afghanis), haberdashery, kerosene, and glass and chinaware. Smaller, but still significant, imports included leather and shoes, cement and building materials, automotive products, and cigarettes.

In addition, sugar and gasoline, imported mainly from Russia, moved into the area from Kabul or over the Herat-Farah road. Sugar consumption in the Valley is estimated at about 5,000 tons, none of which is produced locally.

On balance, the afghani value of exports through the Kandahar Customs House slightly exceeded that of imports during 1955-56.

Marketing Practices and Organization

Marketing practice and structure in Afghanistan differs widely for different kinds of commodities, ranging from complete government monopoly, as in the case of sugar, to virtually uncontrolled individual enterprise, as in the case of fruit export and cloth import.

EXPORT. During the past few years, the government has either directly or indirectly taken steps to insure receiving the foreign exchange earned from some of its principal exports. The most direct form of such action is the grant of sole

export rights for animal casings to the Monopolies Commission. Cotton export is less completely controlled. Seventy-five percent of cotton exports are handled by the Cotton Company, in which the government holds a 51 percent interest and which is required to turn over all its foreign exchange to the government. The cotton mills also obtain their raw materials from the Cotton Company. The control over wool export is also less direct. The Wool Sherkat is, in large part, privately owned and does not enjoy a monopoly, though it does account for the bulk of legal exports. It too must turn over all its foreign exchange earnings to the government. In contrast, the export of fresh and dried fruit, as well as of hides and of most other commodities, is in the hands of individual traders who are at present permitted to retain their foreign exchange earnings and dispose of them on the free market.

IMPORT. Imports show a similar variation but for different reasons. Government action in this field is designed to preserve stable markets for certain basic essentials and probably also to permit effective utilization of credits obtained on sales to the Soviet bloc. Thus, sugar import, as well as all internal sale of both imported and domestic sugar, is reserved to the Government Monopolies Department. All sugar, regardless of source, is resold by the Department through the bazaar keepers at a uniform price which has not been changed for years. The bazaar keeper sells the sugar at the fixed price of 70 afghanis per seer (16 lbs.), out of which he retains a 1-½ percent commission. There is no special price for industrial quantity purchases, such as by the Pushtoon Industries. On its purchases of sugar from domestic producers, the Department does not negotiate a firm price but simply pays 15 percent over total production costs.

The Monopolies Department similarly is the sole importer of petroleum products, as well as their sole distributor at retail. Cigarette and tobacco imports are also reserved exclusively for the Department.

Imports of most other commodities are in the hands of private traders. Importers of machinery can obtain their foreign exchange directly from the government at the rate of 32.35 afghanis per dollar. In contrast, importers of such consumer goods as textiles and apparel at present have to obtain their foreign exchange from the free market. The usual source for importers in the Kandahar region is the foreign exchange earnings of the fruit exporters, particularly from their sales to India. The importer purchases from the fruit exporter his rupee receipts together with the bill of entry for the fruit. These can be converted in India into other currencies through the Reserve Bank of India.

INTERNAL TRADE. Except as noted above, internal trade in the area is not highly organized. The individual bazaar keeper is the key figure, handling virtually all retail trade and usually obtaining his supplies directly without any wholesale intermediaries. The bazaar keeper also finances a substantial amount of the home industries, either by supplying materials or by advancing part of the agreed purchase price of the finished article. In many cases, such as shoe manufacture, metal work and tailoring, the bazaar keeper is himself the artisan.

ELECTRIC POWER

The Present Situation

The lack of an adequate and reliable power supply is seriously hampering industrial activity and development in southern Afghanistan. No commercial power is available, except in Kandahar, and there total generating capacity, part of which is out of repair, amounts to only 940 KW. There are two portable 50 KW diesel generators at Girishk and 350 KW of diesel capacity at Lashkar Gah, but these do not sell power commercially. The sources of Kandahar power are:

The Kandahar Electric Company (A branch of the national General Electric Co., 70 percent Government owned with headquarters at Kabul)	
Hydro Plant on Patow Canal	264 KW
Diesel Plant in Kandahar	256 KW
The Pushtoon Company	
Diesel Plant	200 KW
Kandahar Woolen Mill	
Standby Diesel Unit	220 KW

Unfortunately, these four sources cannot be simply added together to provide an indicated combined capacity of 900 to 1,000 KW. The unit at the woolen mill has been out of order for the past six months and requires major repairs and replacement parts. It has not been used regularly to supplement city power and, when it is in order, is of importance principally as a standby unit for the woolen mill.

With respect to the other units, the practice has been to depend on the hydro plant for daytime power and to supplement it with both the Electric Company's diesel and with energy purchased from the Pushtoon diesel for evening peak load. The local manager of the Electric Company estimated the winter evening peak load at 850 KW. If this figure is correct, it obviously strains the available capacity seriously. The normal daytime load would be about 150 to 200 KW, of which 80 to 100 KW was estimated by the manager as representing consumption by the woolen mill. Total power output of the Electric Company, including purchased power, was reported to have been 120,665 KWH during the winter month of January 1956 and 107,000 KWH during May 1956. While the evening load seriously strains existing capacity, it is apparently far below potential demand. It is reported that there are many requests for connection which have been denied and that appeals from these denials have been carried to high government officials.

POWER RATES. There are at present about 2,000 residential connections, with an average monthly consumption of 15 KWH at 3 afghanis per unit. At this low

price, equivalent to a monthly bill of 45 afghanis or about 90 cents at the free market rate, it is apparently cheaper to buy electricity than kerosene for lighting and even for some heating purposes. It is admitted, moreover, that the company cannot operate profitably at this rate. Certainly, as regards the power it purchases from Pushtoon for 2.6 afghanis per KWH, sales at 3 afghanis must represent a substantial loss when distribution losses and overhead costs are taken into account. Production of its own diesel power requires 19 Imperial gallons of fuel at 13.75 afghanis per gallon, or about 260 afghanis for fuel cost alone for an output of probably 200 to 250 KWH. Taking distribution, overhead and other costs into account, 3 afghanis is clearly a low price for lighting service. The present rate for industrial service is 1-½ afghanis per KWH. This generally low-rate policy has been maintained under government instruction because of the low-income level of the bulk of consumers. Rates charged by the company in Kabul are actually much lower, amounting to 1 afghani per KWH for lighting and ½ afghani for industrial power.

POWER RELIABILITY. The serious immediate problem is unreliability. As a result of a break in the Patow Canal, the hydro generator was out of service from April to August of this year, cutting off the normal source of daytime power. It was not considered feasible to run either the Electric Company's nor the Pushtoon Company's diesel during the day to meet the emergency, because it was felt that such continuous use might result in breakdowns. In fact, the Pushtoon Company did not even operate its generator to supply its own plant during this period. As a result, the woolen mill closed down, the Pushtoon plant did no fruit processing, and a number of small shops dependent on electric power suspended operations. It is noteworthy, also, that some other small shops with mechanized equipment have installed their own power units because they could not rely on a dependable supply of purchased power. In short, the present supply of industrial, daytime power is limited to that generated in the Patow hydro station, and its capacity seems barely sufficient to satisfy existing demand and is certainly inadequate to support any significant industrial expansion.

In view of the urgency of expanding the supply of power, work is under way on a hydroelectric installation at a power drop in the Boghra Canal near Girishk, plans have been prepared for a plant at the Arghandab Dam, and a major development at Kajakai Dam has been proposed.

Girishk Power Development

Orders have already been placed for the initial Girishk installation, consisting of two 1,500 KVA 3,300 volt, 50 cycle, 3-phase generators, together with the necessary transformers and transmission lines. Ultimate development calls for a third 1,500 KVA generator. Releases of water at Kajakai Dam can be so regulated as to permit full power output at Girishk throughout the year. Any excess water over irrigation requirements can be spilled into the river through the wasteway 5.2 kilometers down the Boghra Canal.

Voltage will be stepped up at the plant to 33,000 for transmission. According to HVA instructions, the initial 3,000 KVA would be distributed as follows: 1,000 KVA to Girishk, 200 KVA to Chah-i-Anjir, 400 KVA to Marja, 400 KVA to Nad-i-Ali, and the balance, but not less than 1,000 KVA, to Lashkar Gah, which is 50 kilometers from the generating station.

In constructing the transmission lines, it is recommended that care be taken to avoid locating poles in "washes" where possible; otherwise, they should be given special protection, such as deeper settings and rip-rapping. It is strongly recommended that any parts of steel poles or crossarms from which water might drip on insulators and deposit iron oxide be galvanized.

The population of Girishk is about 5,000 and that of Lashkar Gah about 2,000 but increasing rapidly. With the development planned at Lashkar Gah, power demand should expand quickly, and it may well exceed 1,000 KVA (800 KW at .8 power factor) after a few years. It is less clear that Girishk demand will rise to anything approaching 1,000 KVA in the near future. Accordingly, it may well prove desirable to increase the relative share of power assigned to Lashkar Gah.

Construction costs for the first two-unit installation are estimated at $1,681,-491 including $238,745 already spent and the estimated contractor's fee. To this amount, $556,714 should be added to cover allocation of a portion of Boghra Canal cost to power, bringing the total investment to about $2,248,000. On this basis, annual costs may be estimated as follows:

Item	*Dollars Per Year*
Amortization over 30 years	$74,000
Interest at 4 percent (annual average)	45,000
Insurance at 0.1 percent of installation cost	1,700
Maintenance and Operation	95,000
Total	$215,700

The income that will be derived directly from power sales will depend upon many factors, including the level and character of demand and the rates charged. The rates will themselves affect the demand. There is no indication yet of any decision regarding the rates to be charged when the plant is completed. As stated earlier, the present Kandahar rates of 3 afghanis and 1.5 afghanis per KWH for domestic and industrial power, respectively, reflect the special difficulties and high costs now prevailing in that area and are three times as high as those in Kabul. As pointed out later in this chapter, the Kandahar industrial rate is probably too high to be consistent with the rapid industrial expansion desired and should probably be reduced no more than 1 afghani per KWH. At the same time, a modest compensating increase in the domestic rate to, say, 3.5 afghanis may be feasible. In order to illustrate the effects of these different rate policies, income has been

calculated on the basis of three alternate assumptions: (1) the present Kandahar rates, (2) the Kandahar rate for domestic power and 1 afghani per KWH for industrial power, and (3) rates of 3.5 afghanis and 1 afghani for domestic and industrial power respectively.

Preliminary estimates by MKA indicate that consumption after several years will reach 10.7 million KWH per annum based on station output of 2450 KW and a 50 percent load factor. For the purpose of computing probable income, it is assumed that 60 percent of total consumption will be for industrial purposes and 40 percent for domestic use.

In computing net income, the gross return in afghanis derived on the basis of these assumptions must be converted into dollars to compare with the annual costs shown above. For this purpose, as in other calculations in this report, the official exchange rate of 21.26 afghanis to the dollar has been used, but the effect of using a much less favorable exchange rate at 40 afghanis to the dollar is also shown for comparision. The results of these calculations are shown in Table No. 5.

Table No. 5

GIRISHK POWER DEVELOPMENT

GROSS AND NET INCOME ON BASIS OF DIFFERENT RATE AND EXCHANGE ASSUMPTIONS

Total Consumption—Million KWH		10.7	
of which—Domestic is 40%		4.28	
Industrial is 60%		6.42	
	Alternate Assumptions		
Rates—Afghanis per KWH	(1)	(2)	(3)
Domestic	3.0	3.0	3.5
Industrial	1.5	1.0	1.0
Gross Income—Thousand Afghanis			
Domestic	12,840	12,840	14,980
Industrial	9,630	6,420	6,420
Total	22,470	19,260	21,400
Gross Income—Thousand Dollars			
(at 21.26 afghanis/dollar)	$1,057	$906	$1,007
Annual Costs	217	217	217
Net Income—Thousand Dollars	$ 840	$689	$ 790
Gross Income—Thousand Dollars			
(at 40 afghanis/dollar)	$ 562	$482	$ 535
Annual Costs	217	217	217
Net Income—Thousand Dollars	$ 345	$265	$ 318

It is evident from these figures that a very substantial net profit over all costs would be realized at the official exchange rate on the basis of each of these assumptions, ranging from $840,000 on the basis of the present Kandahar rates to $689,000 if the industrial rate is reduced to 1 afghani but the domestic rate left unchanged. In each case, moreover, the annual gross would be well over four times annual costs.

Using the less favorable exchange rate of 40 afghanis to the dollar, both the indicated gross and net would be cut considerably. But, even on that basis, the indicated profits would still be substantial, ranging from $265,000 to $345,000, and the gross in each case would be considerably more than twice annual operating costs.

It should be borne in mind, however, that it may be a good many years before power demand reaches a level commensurate with the consumption estimates used above and that every effort, including an appropriate rate policy, will have to be made to stimulate the growth of demand. This problem, as well as the possibility of charging special promotional rates for surplus power used as a fuel substitute, is discussed later in dealing with industrial development.

Arghandab Power Plant

At the Arghandab Dam, approximately 30 kilometers northeast of the City of Kandahar, a power tunnel was constructed through the westerly abutment of the dam, with sufficient capacity to permit the development of 12,800 KW of power. Provisions were made in the design for the installation of four 3,200 KW units. Twenty-five percent of the cost of the dam, or about $1,800,000, has been allocated to power.

Plans already prepared call for an initial installation of two 3,200 KW units or a total of 6,400 KW. Bids for these two units were received some time ago, but the project has been temporarily held up pending decision on means of financing and on the source from which the equipment is to be procured. The present estimated cost of power plant and transmission facilities is $2,400,000, not including the allocation for cost of the dam.

As the primary purpose of the dam is that of storing and regulating the flow of the Arghandab River for irrigation, the amount of power generated will be dependent primarily upon the discharge required for irrigation and the number of generating units installed. The minimum discharge for irrigation occurs from October to February. Under usual flow conditions at that time, 2,300 KW can be generated at a 100 percent load factor and larger peaks if the load factor is less but, during a dry year or a succession of dry years, the water available during these winter months may be insufficient to generate enough power to meet the demand.

GENERATION AND DISTRIBUTION. It is proposed to generate power at 3,300 volts, 3-phase, 50 cycles. Generators will be paralleled at generator voltage and the voltage stepped up to 66,000 volts. The power is to be transmitted at 66,000

volts to the Kandahar receiving station over a single circuit, a distance of 31.1 kilometers. The conductors would be supported on steel pipe poles with a nominal ground clearance of 8.2 meters. The receiving station will have a bank of transformers of the same rating (7,000 KVA) as the power plant. The power is to be distributed over two 3,300 volt feeders to tie in with the Kandahar Electric Company's system. Provision has been made for two additional feeders when required. As recommended above for the Girishk installation, special attention should be given to location of transmission line poles and galvanizing of steel work above insulators when the work is undertaken.

To provide proper service, it will be necessary for the Kandahar Electric Company to rebuild its distribution system so that there can be proper voltage regulation for the use of motors and appliances. This should be done while the power plant is under construction so that immediate use may be made of the power when available. Reconstruction of the distribution system will cost about $300,000.

POWER CONSUMPTION ESTIMATES. As noted earlier, power consumption in Kandahar was about 120,000 KWH in January 1956 and about 107,000 KWH in May, but potential demand is much greater. As industry and the economy, generally, expand, demand is sure to rise rapidly. MKA estimated power consumption during the first few years after the completion of the project at 13,140,000 KWH, rising to 15,987,000 KWH within three years thereafter. These figures may be optimistic, and their attainment will depend in good part upon the rate at which industrialization progresses. It may be noted, however, that the new international airport will alone provide a demand of about 600 KW.

For the purpose of estimating gross and net returns from the Arghandab development, it is assumed that a load of 13.1 million KWH will be reached within a few years and that 60 percent of the consumption will be for industrial use. It is further assumed, that generation will be controlled by HVA and that the power will be sold at wholesale to the Kandahar Electric Company at rates equivalent to two-thirds of the retail prices to be charged by that company.

COSTS AND INCOME. As in the calculations made for Girishk, three alternative assumptions with regard to retail rates will be made: (1) that the present rates of 3 afghanis and 1.5 afghani for domestic and industrial power respectively will be continued, (2) that the industrial rate will be reduced to 1 afghani with no change in the domestic rate, and (3) that, concurrent with the reduction in the industrial rate, the domestic rate will be advanced to 3.5 afghanis. Net returns have been computed on the basis of the official 21.26 exchange rate and also at the less favorable 40 afghani rate, as was done in the case of Girishk.

One additional factor needs to be considered in this connection. It is useful to appraise profitability not only in relation to the total costs of the completed installation, including the appropriate proration of the investment already made in the Arghandab Dam, but also in terms of the return on the new investment re-

quired at this time to complete the project. Table No. 6 shows estimates of annual cost on these two bases, while Table No.7 presents the annual gross and net returns in terms of each of the assumptions set forth in the paragraph above.

Table No. 6

TOTAL AND ANNUAL COSTS — ARGHANDAB POWER

1. Costs previously incurred	
Allocation of Dam cost—$1,800,000	
Amortization over 30 years	$60,000
Interest at 4% (annual average)	36,000
Insurance at 0.1%	2,000
Annual cost, past investment	$98,000
2. Additional investment and operating costs	
Cost of plant and transmission—$2,400,000	
Amortization over 30 years	$80,000
Interest at 4% (annual average)	48,000
Insurance at 0.1%	3,000
Maintenance & Operation (wholesale only)	75,000
Annual cost, excepting past investment	$206,000
3. Total annual cost, including past and additional investment	$304,000

It is evident from these calculations that project income should more than cover annual costs even on the basis of the most unfavorable of the assumptions used. As related to the new expenditures required for completion, and ignoring the proration of the costs of the Arghandab Dam, the margin should be very substantial in all cases. It is, of course, possible that consumption will not reach the assumed level for some years but, even at considerably lower levels of demand, there would still be a profit, particularly in relation to the new investment required.

COST OF DISTRIBUTION IMPROVEMENTS. In addition to the investment in the generation and transmission system, about $300,000 will be required for the parallel development of the Kandahar distribution system. It is difficult to calculate with any degree of assurance the annual costs and benefits on the retail part of the operation. Such estimates would also have to include allowance for the investment of about $200,000 in and operation of the two 500 KW diesel generators, which are recommended below for immediate purchase. It seems reasonably clear, however, that the Kandahar Electric Company should earn a substantial net return on these added costs, which are, in any event, an essential part of the total development.

Table No. 7

ARGHANDAB POWER GROSS AND NET INCOME ON BASIS OF DIFFERENT RATE AND EXCHANGE ASSUMPTIONS

Total Consumption—Million KWH		13.1	
of which—Domestic 40%		5.24	
Industrial 60%		7.86	
	Alternate Assumptions		
Rates assumed (wholesale at 2/3 of retail) Afs. per KWH	(1)	(2)	(3)
Domestic	2.0	2.0	2.333
Industrial	1.0	.667	.667
Gross Income—Thousand Afghanis			
Domestic	10,480	10,480	12,225
Industrial	7,860	5,243	5,243
Total	18,340	15,723	17,468
Gross Income—Thousand Dollars	$863	$740	$822
(at 21.26 afghanis/dollar)			
Annual Costs, excluding dam cost	206	206	206
Net Profit before Dam Cost	$657	$534	$616
Proration of Annual Dam Costs	98	98	98
Net Profit after All Costs	$559	$436	$518
Gross Income—Thousand Dollars			
(at 40 afghanis/dollar)	$459	$393	$437
Annual Costs, excluding dam cost	206	206	206
Net Profit before Dam Cost	$253	$187	$231
Proration of Annual Dam Cost	98	98	98
Net Profit after All Costs	$155	$ 89	$133

RECOMMENDATION. The Arghandab power development would clearly be of great economic benefit to the Helmand Valley and the country as a whole and should pay for itself through power revenues. *It is, therefore, recommended that the development be undertaken as soon as possible.*

In view of the existing acute power shortage and the time required to complete the hydro installation, *it is also strongly recommended that two 500 KW diesel units be installed at Kandahar immediately.* They will serve later on to supplement hydro power when necessary. The estimated cost of two 500 KW units is $200,000.

elicit interest on the part of an American oil company and in the negotiation of an appropriate agreement between the government and such a company. (Chapter VIII)

RECOMMENDATIONS FOR ICA STAFF

18. POSITIONS TO BE FILLED. (Chapter V) To assist the HVA in carrying out and improving its operations as proposed in this report, it is recommended that ICA employ or contract for the following staff:

a. Deputy Director for Helmand Valley program.

b. Plant Pathologist-Entomologist.

c. Irrigation Agriculturist.

d. Irrigation Engineer, with electrical experience.

e. Public Health Team, under contract:

(1) Public Health Officer and Adviser.

(2) Public Health Nurse.

(3) Public Health Educator.

(4) Sanitary Engineer.

f. Farm Machinery Specialist.

g. Social Economist.

h. Adviser in Rural Development.

i. Handicraft Specialist.

j. Equipment Operation and Maintenance Superintendent.

Kajakai Power

When Kajakai Dam was built on the Helmand River, a tunnel was constructed to carry water through the southerly abutment for a future power plant. The plant contemplated would consist of four 30,000 KVA units with a total capacity of 120.000 KVA. It is considered that, of this amount, 65,000 KVA would be firm capacity and that 90,000 KVA would be firm at 50 percent load factor. The cost of constructing the first two units of this plant was estimated in 1953 to be $10 million without transmission lines.

At the present time, there is no market for this power. As a market develops, the plant should be built in stages, the first being two units and the next either one or two units as conditions may require. If major loads eventually develop in the vicinities of Girishk and Kandahar for this power, consideration should then be given to tying in the Kajakai and Arghandab plants in order to produce the greatest overall efficiencies in operation.

Consideration has been given to the possibility that the City of Quetta in Pakistan might be a power market for Kajakai power. Estimates as to the potential load in that city vary from 2,000 to 5,000 kilowatts. The distance from Kajakai to Quetta is approximately 200 miles. It is not economically feasible to transmit this small amount of power over such a great distance, and it is, therefore, recommended that the Quetta area not be considered as a potential market unless a much greater demand should develop.

POSSIBLE FERTILIZER PLANT AT KAJAKAI. The most probable justification for developing Kajakai power would be the establishment of a plant for producing nitrogenous fertilizer. Such a plant would derive hydrogen from the electrolysis of water and nitrogen from liquid air. These two gases would be synthesized into ammonia by catalysis at high temperature and pressure. Part of the ammonia would then be oxidized to nitric acid to produce ammonium nitrate.

A sizable plant of this type could use substantial quantities of electric power. Thus, it may be estimated that production of 35,000 tons of ammonium nitrate annually would represent a power demand of about 50,000 KW. If there were a ready market for the fertilizer, development of Kajakai power could then be justified economically. Comparative cost studies would have to be made to determine whether the fertilizer plant should be erected near the dam, adjacent to the power source, or in the Kandahar area nearer labor supply and markets.

While the proper use of fertilizer, including phosphate as well as nitrogen, would substantially raise agricultural output, it is unlikely that anything like 35,000 tons of ammonium nitrate can be utilized efficiently during the next few years. It takes time to convince farmers of the advantages of buying fertilizer and even longer to teach them to use it properly. Consequently, while ultimate use of this volume of fertilizer can be envisaged readily, the internal market will not develop for some time. Until this market is developed, it would be more

economical to import gradually increasing quantities of fertilizer than to have a large plant working at a small fraction of capacity.

However, fertilizer demand and use is increasing rapidly throughout South and Southeast Asia, and the expansion of capacity is not keeping pace with demand. It might, therefore, be possible to export part of the product of a nitrogen plant to Pakistan and other neighboring countries until internal demand catches up with supply, and it may be worthwhile to explore these export possibilities. If they do exist, it may be feasible to conclude firm contracts for future delivery of ammonium nitrate at an agreed price. The quantities committed could be on a decreasing scale to leave room for expansion of internal use. Payment might be partly in cash and partly in commodities, particularly in coal or petroleum.

If such a contract could be concluded, immediate development of the Kajakai project would probably become economical. Under such circumstances, it might be possible to borrow the funds required from the International Bank for Reconstruction and Development, since the returns would be in good part guaranteed. In the absence of this kind of arrangement, the economics of embarking on this kind of project at this time would appear doubtful and postponement would seem indicated.

Electric Power Rates

The problem of the rate structure for industrial electric power merits special consideration. As pointed out above, rates now charged by the Kandahar Electric Company are three times those in effect in Kabul. They clearly reflect the present high operating costs, including the cost of purchasing power at a high price from the Pushtoon Industries. The 1.5 afghani rate now charged for industrial power in Kandahar is equivalent to about 7 cents at the official rate of exchange and at from 4 to 5 cents if a more representative exchange ratio is applied. This power rate may be too high to encourage the desired rate of industrial expansion. *This is a matter which should receive careful consideration by the operating agency as soon as the new hydro plants are ready for service.*

INDUSTRIAL DEVELOPMENT

Factory Industry

As mentioned above, the only two sizable industrial establishments in the area are the Kandahar Woolen Mill and the Pushtoon Industries. Both were established some 15 to 20 years ago, and both have deteriorated rather than improved and expanded since their erection. According to high government officials, both these plants were started with high hopes of forming the nucleus of industrial development in the area, and neither has fulfilled its promise.

There is no lack of raw material to support substantial further development of factory industry, which would presumably be located principally around Kandahar and Lashkar Gah. The principal materials now suitable for industrial processing in the Kandahar region are fruit, wool, and hides and skins. At Lashkar Gah, agricultural diversification should provide sugar beets and probably

cotton at least. For both areas, the electric power development, discussed in the preceding section, should provide adequate electricity for factory operation.

Except as specifically noted, it is assumed that the development recommended below will be in the hands of private enterprise. As far as government is concerned, the recommendations presented, therefore, relate to the kinds of enterprise that are regarded as being desirable to encourage and facilitate.

FRUIT PROCESSING — THE PRESENT SITUATION. Top priority should obviously be assigned to improving fruit handling and processing facilities, particularly for export. The only factory now equipped with fruit processing machinery is the Pushtoon Industries. This plant was established originally for the primary purpose of providing better facilities for handling the fruit produced in the area through processing, canning and packaging. It has facilities for canning fruits and jams, packaging dried fruits, and producing and bottling soft-drink syrups. However, the great bulk of its present business consists of manufacturing and selling ice (58%) and producing power for sale to the city electric system (32%). The only significant improvement made since its erection has been doubling the capacity of the ice plant.

According to the management, the limiting factor on the production of fruit products is the lack of sugar. With adequate sugar, they claim that output of these items could be increased tenfold. Information from the Monopolies Department indicates that there have, in fact, been difficulties in transporting sufficient sugar supplies from Russia to Kandahar over the Herat-Farah road.

The fruit processing facilities of the plant were shut down during the visit of the Survey Team in July and August, due to lack of power. From what was seen, there is some question as to the sanitary standards maintained. Raisins and other dried fruits were spread out on the floor of a fly-infested room and were being packed by boys into attractive boxes which laid claim to the highest hygienic standards. In the absence of power, candies were being made by hand, with no handling precautions evident.

It is particularly significant that none of the product of this plant is being exported. The internal market is evidently ample and profitable, and there is either inadequate incentive or insufficient initiative to explore and develop foreign markets.

Disappointment at the failure of the Pushtoon Industries to play its expected role in improving fruit marketing for export was at least one of the factors leading to the recent formation of a new fruit export corporation in Kandahar. Composed of some of the city's principal merchants, it was started with a capital of 40 million afghanis. It will take over a small new fruit warehouse now nearing completion close to the present Kandahar airport and will build refrigeration facilities and additional storage space. The president and other major stockholders of the new concern were not yet wholly clear as to the exact way in which it would operate, but they were very specific in defining its primary objective as increasing the export revenue from Kandahar fruit. (It is noteworthy in this connection

that export of fresh and dried fruit, principally through Kandahar, comprised almost 30 percent of Afghanistan's total foreign exchange earnings in 1955-56).

RECOMMENDED ACTION — FRUIT PROCESSING. The first essential step toward providing a sound fruit processing industry is the accumulation of knowledge regarding the processing methods best suited to the kinds of fruit available and conditions in the area and as to the nature of export demand for the product. Both technical and market research is, therefore, urgently needed. With this in mind, as far back as April 1948, MKA submitted "A Report on Development of the Fruit Industry of Afghanistan," prepared by A. B. Sabin, to His Excellency M. K. Ludin, then Minister of Public Works. This report urged the prompt establishment of a fruit research center in Kandahar, to be set up as a semi-commercial plant, to conduct research into methods of fruit handling and processing for export and for training personnel in this field. No action was taken on this report, and none seems now contemplated. It would appear, however, that establishment of this kind of center is urgently needed if Afghanistan is to derive the maximum benefit from its fruit export potential. This would, of course, have to be a government venture. The cost would be relatively moderate, probably about $200,000 for the first two years, of which about $125,000 would be foreign exchange, partly for training personnel abroad. The returns to the national economy should be very substantial. *Accordingly, prompt action along the general lines set forth in the Sabin report is strongly recommended.*

Until the results of at least preliminary research become available, it would seem undesirable to contemplate any substantial new investment in fruit canning or preserving facilities pending receipt of the results of technical and market research. In the meantime, consideration might be given to using some of the capacity at Pushtoon Industries to test out the market. Perhaps additional sugar could be made available to the plant on the understanding that the product would be exported. This should not, however, be regarded as a substitute for the broader research program recommended but rather as one phase of such a program.

Assuming that the newly formed fruit syndicate will go ahead with the erection of fruit storage and refrigeration facilities in Kandahar, arrangements should be made to reduce spoilage in transit between the warehouse and the export markets in India and Pakistan. Refrigerated trucks could be provided for shipment from Kandahar to Chaman, but this would be of little value unless proper arrangements are made for preservation during transhipment in Chaman and rail transport thereafter. If the provision of such facilities could be worked out with the Government of Pakistan, the cost of providing and operating them would then have to be weighed against the savings through reduced spoilage. While it seems likely that substantial net savings would result, this cannot be certain without such cost estimates, which go beyond the scope of the present survey.

WOOL TEXTILES. Next to fruit, wool is the most important industrial raw material produced in the area. Output is estimated at about 10 million pounds, greasy basis, equivalent to some 5 million pounds of scoured wool.

The Kandahar Woolen Mill, started about 20 years ago, has a nominal single-shift capacity of about 120,000 kilograms (264,000 pounds) of coarse cloth or about 50,000 kilograms (110,000 pounds) of finer cloth. It has 2,160 spindles, 20 large and 15 small looms, with the usual range of preparatory, finishing and auxiliary equipment. It produces on the woolen system only. It does not have the combs needed for worsteds. It can produce yarn from the available wool up to No. 10 on the metric system (10 meters per gram, equivalent to about No. 3 on the New England run system). The mill epitomizes, in many ways, the problems and obstacles confronting major industrial development in the area. As compared with the nominal capacity of 120,000 kilograms, actual output in the year ended March 1956 was 67,739 kilograms of yarn, the bulk of which was used to produce 48,222 linear meters of cloth, mostly coarse, weighing 45,828 kilograms. This was, moreover, by far the highest production achieved during the past six years.

The immediately apparent reason for the generally low level of production is the poor state of maintenance of the equipment. Only three of the four carding machines are working, the fourth having been cannibalized to keep the others operating. The cards are dull and their product clearly imperfect. About one-third of the spindles are out of order. There is one winding machine which originally could supply 110 percent of the capacitv of the looms. At present only half the units in this machine can operate, which reduces its capacity to 55 percent of what the 35 looms could handle. Since only 12 large looms are now in order, winding is not a bottleneck for the time being.

The failure of the management to maintain the plant's machinery has been attributed to the fact that the equipment was originally purchased in East Germany and that replacement parts from that source have for some time been unobtainable. Now, however, it is understood there is a plant in Hamburg which can supply the items required, but the management has not undertaken the steps necessary to arrange procurement. While depreciation is shown on the company's books at 2-½ percent for buildings and 6 percent for machinery, there is no evidence that a depreciation reserve has actually been built up to finance maintenance and replacement. In short, it seems clear that the generally run-down condition of the plant can be attributed far more to the lack of vigorous management, willing to set aside the funds and resources needed for proper maintenance, than to the specific difficulties associated with the original source of the equipment.

The cloth produced during the last year was almost entirely of the coarse variety. There has been a progressive trend during the past five years toward increasing concentration on heavy uniform cloth for the Army, which is sold in natural color and not dyed. The material is sent to Kabul for making up into uniforms. None is sewed locally.

This emphasis upon military cloth reflects the fact that the civilian market for factory-produced woolen fabric is limited. Imports of woolen cloth have been small, amounting in 1955-56 to only 110,000 pounds for the country as a whole, of

which only about 10,000 pounds cleared through the Kandahar Customs House. The bulk of the civilian demand appears to have been satisfied from hand woven cloth and imported second-hand clothing. Development of the civilian market will presumably require considerable reduction of cost to bring the product within the means of the average buyer. Present management seems unequal to this task.

In addition to scouring facilities for its own production, the Kandahar Woolen Mill has four batteries of washing machines which were intended to provide scouring capacity sufficient to take care of all the woolen production of the Kandahar area. Efforts have been made to induce wool merchants to avail themselves of these facilities, and thus enable them to ship clean wool for export, saving freight and other costs. Up to now, however, the merchants continue to have their wool washed in rivers and streams which, of course, only removes a small proportion of the dirt. The use of mill facilities could save appreciable foreign exchange. It would, however, be necessary to dig a well to provide sufficient water for the plant and also to obtain a reliable source of power. It would also require the use of an additional 8 kharwar (about 5 tons) of wood per day.

Partly as a result of dissatisfaction with the existing management, it is understood that steps toward a complete reorganization of the company are contemplated and may, in fact, have been initiated.

Taking these and other factors into account, it is recommended that:

(a) Reorganization of the mill be effectuated promptly and new and efficient management installed.

(b) Necessary repair parts be procured and the machinery restored to full working order.

(c) In addition to cloth, production be geared to supplying yarn to cottage industry, particularly for carpet and rug manufacture.

(d) Steps be taken to bring about utilization of the mill's facilities to scour all locally-produced wool destined for export.

TANNERY. At present, the Valley is a substantial exporter of hides and skins, primarily goat and sheep skins, and an importer of leather and leather products, mainly shoes. Skins are exported after preliminary salting only, and tanning for internal use is crude and inefficient. *It is, therefore, recommended that a modern tannery be established in the Kandahar area.* This would both reduce import requirements by making more and better leather available for shoe manufacture and increase export earnings by permitting the hides and skins to be shipped in more highly processed form. The investment would be small in relation to the returns.

SUGAR MILL. According to the Monopolies Department, present sugar consumption in the area is about 5,000 tons annually. Potential demand is considerably higher, both for direct consumption as living standards rise and for fruit processing as that industry is developed. Soils of the Valley are suitable for sugar beets but, before planting of any substantial acreage is undertaken, there must be

a mill to purchase the production. In addition to producing sugar, the mill would also be a source of beet pulp which is a valuable feed, particularly if enriched with molasses.

The major difficulty in the way of establishing such a mill is the shortage of fuel, but this should not be regarded as controlling. If sufficient wood is not available, fuel oil can be imported at considerably less cost in foreign exchange than the amount of sugar which would be produced. It may also be possible to use electric power as a partial fuel substitute, if off-peak power becomes available at low rates.

It is, therefore, recommended that a sugar mill be erected in the Lashkar Gah area, as soon as possible, with an initial capacity to produce 3,000 to 5,000 tons of sugar per year or, say, 50 tons per day. Provision for future expansion should be included in the plans. The cost of such a mill would probably be between $1 million and $1.5 million. The HVA at the proper time should undertake to make available the acreage of sugar beet planting necessary to supply such a mill. (It may be noted that the sugar mills now established in Afghanistan are owned by the Sugar Company, in which Bank-i-Mille has an 80 percent ownership.) Gross revenue from 4,000 tons at 6 afghanis per kilogram (the price now paid for domestic sugar by the Monopolies Department) would approximate 22 million afghanis. Additional revenues could be derived from selling pulp for feed.

COTTON TEXTILES. From the standpoint of local market demand, no single development is more clearly called for than a cotton textile mill. More than half of the value of imports through Kandahar consists of cotton fabric, and there is every reason to assume a steady increase in consumption.

On the basis of present information, however, it is not entirely certain that enough raw cotton can be grown in the Valley profitably to support a cotton mill of minimum economic size. While the limits of economic size vary considerably with local conditions, it seems likely that a throughput of at least 3 to 4 million pounds of lint would be required to make the venture profitable. Using the 3 to 1 ratio, characteristic of Afghan experience, this would necessitate a supply of 9 to 12 million pounds of raw cotton at the minimum. While it would not be essential that this full amount be available during the first year or two of the mill's operation, there should be reasonable assurance that such a level could be reached fairly soon thereafter.

It seems likely that cotton can be grown economically in the area in the quantities indicated. Before proceeding with the substantial investment involved in a cotton mill, however, it would seem prudent to acquire enough additional experience to verify this judgment by actual test. This could be done by embarking upon a program of increasing the acreage devoted to cotton production as rapidly as practical, ginning the cotton locally, and either sending it north for processing or selling it abroad. When and if output reaches at least 2 million pounds of seed cotton, it should be possible to determine with reasonable assurance whether the minimum goal of 5 to 6 times that amount, as suggested above, is a practical ob-

jective. Until this is done, it would seem unlikely that private capital would venture the necessary investment. Even if government investment were contemplated, the same considerations should apply.

It is, therefore, recommended that:

(a) Cotton planting on the new lands be encouraged, with a view to ultimately devoting enough acreage to produce at least 5,000 tons of seed cotton.

(b) Until this program shows reasonable promise of success, establishment of a cotton textile mill in the area should be deferred.

(c) If and when such promise of success is achieved, every encouragement and support should be given to the erection of a mill in the Lashkar Gah area.

COTTON GIN AND COTTONSEED OIL. Increased cotton production would, of course, require adequate ginning facilities. There is now one gin at Lashkar Gah, recently installed by the Cotton Company at the request of the HVA to handle the cotton production from the project area. This is an old gin, subject to periodic breakdowns. In 1955-56, it processed 262 kharwar (about 168 tons) of seed cotton, obtaining 6,502 seers (about 52 tons) of lint. This 31 percent yield is apparently in line with experience elsewhere in Afghanistan. While some initial complaints were made by the Cotton Company about the quality of the cotton received, the President of the company now indicates that quality is very good. With the exception of a small quantity of the best seed which was returned to the farmers for this year's planting, the bulk of the seed from last year's operation, probably close to 100 tons, is still on hand. No plans for its disposition could be discovered.

As cotton output increases, and regardless of whether it reaches a level sufficient to support a textile mill, added ginning facilities must be installed and provision made for using the seed produced. *It is therefore, recommended that:*

(a) The Cotton Company be requested to augment ginning facilities at Lashkar Gah to keep pace with cotton output.

(b) As soon as the volume of seed ginned becomes adequate, a cottonseed mill be established in the Lashkar Gah area to produce oil for human consumption and feed for livestock.

Smaller Scale Machine Industry

While no new sizable factories have been built in the area during the past decade, a number of smaller mechanized operations have sprung up during the past few years, all around Kandahar. These are all individual proprietorships or partnerships and, except for one small bank loan, the owners in each case supplied the capital required out of their own resources. Most importantly, all appear to be operating successfully and profitably, despite the fact that some comprise what might appear to be illogical combinations of equipment.

One of these smaller shops was established to handle truck repair by two brothers, one of whom had gained experience in MKA. Another shop includes

three flour mills, powered by a 57 HP gas engine, each of which processes 600 pounds of flour per hour; two band saws used to make fruit boxes out of scrap wood; a thread winding machine; a machine for making rope from reed; and a wood lathe, not yet assembled, for the production of furniture. A third shop displayed the same unrelated miscellany of equipment, including a turret lathe; a welding machine; a grinding wheel; a small cottonseed-oil extraction press; several flour mills; and a bandsaw. The operation is powered by a 22 HP diesel motor and can also draw on city power when available.

These instances testify to a rapidly growing interest on the part of the Kandahar business community in investing in mechanized equipment. This interest was expressed enthusiastically by all the merchants interviewed, though with little definite idea as to the kinds of equipment they should purchase. The peculiar combinations cited above reflect both this uncertainty and a willingness to go ahead and experiment in the face of it. There seems to be no lack of capital for smaller enterprises of this kind or of skill to operate them and foreign exchange is made available without difficulty at the rate of 32.25 afghanis to the dollar. The present necessity of providing auxiliary power equipment adds to the required capital investment, but this has not constituted an insuperable obstacle.

Perhaps the most important single step that can be taken to encourage and facilitate this kind of development is to make available some source to which prospective investors, of which there appear to be many, can turn for technical advice and assistance. His Excellency, the Governor of Kandahar, expressed his desire that the Ministry of Mines and Industry establish a branch office in the province, which could perform this function. It would seem desirable that such action be taken as soon as possible. The Governor also requested that an American industrial specialist be made available in Kandahar to advise and assist prospective investors. *It is recommended that this request be given serious consideration by ICA.*

The time available for the present survey was not sufficient to permit formulating any comprehensive recommendations as to the kinds of smaller mechanized industries that might profitably be introduced in the area. However, on the basis of the information available, the following suggestions seem appropriate:

(a) Additional metal working and machine shop and foundry capacity is needed, both for repair of automotive and other equipment and for producing simple items such as nails and hand tools. Requirements for this kind of facility will increase rapidly as industrialization develops.

(b) Mechanized woodworking shops could provide both finished consumer goods and tools and equipment for handicraft industry.

(c) Serious consideration might be given to a small clothing factory. To start with, such a plant could make uniforms for the military out of cloth produced in the Kandahar woolen mill.

(d) Soap production by handicraft is inadequate and the grade poor.



Figure 16
Metal Shop in the Bazaar at Kandahar



Figure 17
Hat Maker in the Bazaar at Kandahar

Chapter I
INTRODUCTION

ICA DIRECTIVE

The present survey was conducted by Tudor Engineering Company in accordance with a directive of the International Cooperation Administration (ICA), dated May 15, 1956, entitled "Comprehensive Survey of the Helmand Valley Development—Afghanistan", a copy of which is attached to this report as Appendix II.

The purpose of the survey, as defined by the ICA, was generally to review the potentials for development of the Helmand Valley in Afghanistan; to review the extent of development to date; and to recommend, with specific regard to the abilities and desires of the Government of Afghanistan and the present and potential population in the Helmand Valley, a program for further development related to the Upper Valley of the Helmand, including ways and means for the establishment of viable village life in terms of human welfare, social organizations, and other factors.

LIMITS OF SURVEY

By the terms of the ICA directive, the survey was limited to the Upper Valley of the Helmand, which was defined as the area which may be served from the waters of the Helmand River and its tributaries upstream from a small village known as Khairabad. This village is at the extreme southerly end of the most southerly project area included within the current construction program.

During the course of the survey in the field, officials of the Afghan Government expressed great concern that consideration was not to be given to those portions of the Helmand Valley below Khairabad. Several of them stated emphatically that the Helmand Valley must be considered as a single entity and that it was not reasonable to divide it. Because of this feeling on the part of the Afghan Government, the Survey Team has given limited consideration to the lower part of the Valley and has included certain comments and suggestions relative thereto.

SURVEY TEAM

The names of the eight members of the Survey Team are listed in the accompanying letter of transmittal. The qualifications of members are summarized in Appendix I.

PROCEDURE FOLLOWED IN MAKING SURVEY

The Survey Team, with the exception of Mr. J. Robert Fluker, assembled in Washington and spent approximately a week there in reviewing a large amount of material which had been assembled from files of the ICA and from other

Small soap factories in the Kandahar and Lashkar Gah areas should be profitable ventures. These could be enlarged as experience is obtained.

(e) Tire recapping facilities may be a logical development.

(f) In view of the need for insecticides and pesticides, a small plant for extracting nicotine from tobacco merits consideration.

(g) In addition to these projects, it may be desirable to erect a mechanized flour mill in the Lashkar Gah area but, in view of the lack of adequate transport facilities, it may be that smaller units located at drop structures in the canals, as previously suggested, will be more practical at this time.

Handicraft and Cottage Industry

The great bulk of industry in the area is still at the handicraft stage. The primary center of handicraft work is in Kandahar and the surrounding region in the Arghandab Valley. While there is some work in and near the bazaars of Girishk, and a new center is developing at Lashkar Gah, village handicrafts in the newly settled areas of the Helmand Valley are generally less developed than in the Arghandab. In only two of the Nad-i-Ali villages was there evidence of such work. This reflects, in part, the relative lack of capital on the part of the new settlers and the demands upon their time imposed by the need for breaking in their farms. At least equally important, however, is the fact that handicrafts tend to be an inherited art and that many of the new settlers, with some important exceptions, lack this inheritance.

The range of items produced is so broad that no complete catalogue is possible. Among the textile processing industries, there are rug and carpet making, embroidery, hand weaving and production of hats, vests, other garments, sacks, and rope. In Kandahar there are a number of hand-operated cotton gins. The hide and leather group includes crude tanning and the manufacture of boots, shoes, and saddlery. Many clay products are made, such as pottery, brick, tile, ornamental items such as lamp stands and ash trays, and even pipe and electric insulators. Metal working includes the production of hand tools and agricultural implements, copper pots and utensils, cases made of the metal from used cans, and intricately fashioned ornaments looking like silver but made from cheap metal. Furniture is the principal wood-working product. Stone work ranges from the fashioning of building stone to the production of prayer beads.

Many of these items are produced on extremely primitive equipment. The workmanship is often of high quality, and the use made of existing resources frequently shows considerable ingenuity. Too often, unfortunately, painstaking workmanship is utilized on very poor materials so that the value of the resulting product is in no way commensurate with the effort that has gone into its production. Almost every trade offers opportunities for improvement in tools or technique or design and styling. The impression gained from talks with many artisans is that they would welcome suggestions that would ease their work or increase or improve their product.



Figure 18
Large Rug Woven in Nad-i-Ali Area



Figure 19
Rug Weaving in Baluch Village Nad-i-Ali

While it would be obviously impossible to describe all these operations in detail, a few will serve to illustrate the practices and conditions prevailing and the problems involved.

CARPETS AND RUGS. With very few exceptions, the rugs produced in the Valley are of the woven rather than the knotted type. These take much less time to produce, are correspondingly cheaper, and are almost entirely for local consumption. The equipment used is fairly primitive. This is particularly true of spinning, which is generally done by twirling a crudely fashioned wooden weight with one hand while feeding in the fiber from the other. The looms are of the simplest kind and, while shuttles are sometimes used, this is by no means universal. Estimates of the time required for weaving vary, but about two man days per meter for a width of 1-¼ meters may be a fair approximation of the average.

Purchase and financing of the operation by the bazaar merchants is done in various ways. In some cases, they contract for a rug and advance 25 percent of its price, paying the balance on completion and delivery. In others, they supply the wool and dyes and, in effect, pay the weavers only for their labor. In still others, they sell the materials to the weavers and pay the entire price on delivery. This can only be done when the weavers have some capital resources. The income of the weaver is about 15 to 20 afghanis per day.

The great bulk of woven rug production in the project area is in the Arghandab Valley. Some are being produced in two villages in Nad-i-Ali, but most of the settlers in the Helmand Valley do not have the inherited rug-making tradition. In the two Nad-i-Ali villages, it was also stated that lack of capital as well as lack of time on the part of the new settlers restricted production.

As regards the much more valuable knotted rugs, which are in demand for export, very few of the inhabitants of the Arghandab and Helmand Valleys have the requisite tradition. However, two exceptions were noted. In the Baluch village on Nad-i-Ali, the settlers had come from an area near Baluchistan and were making a few knotted rugs which appeared to be of good though not of top quality. In the Seraj region, most of the settlers are refugees from Russian Turkestan and are capable of producing rugs of high quality. Lack of capital, however, has prevented these skills from being used effectively.

OTHER WEAVING. There is considerable other weaving in the area, primarily of woolen fabrics, including bags as well as cloth to be made up into garments. Most of this is in the Arghandab Valley, though some is done in the Seraj. In one village in the Seraj, a crude spinning wheel was seen instead of the usual simple weight, and the loom also seemed more advanced in design than the usual types.

ROPE MAKING. Rope making is centered around the Kandahar region. Most of the equipment is of the simplest variety, though one artisan was using an up-ended bicycle to turn his spindles.

EMBROIDERY AND APPAREL. It was estimated in the MKA Industrial Survey that some 10,000 persons in the Kandahar region are engaged in producing em-

broidery and apparel. These items are for internal use. Exports, if any, are insignificant. The embroidery work is done primarily by women in their homes and is used in hats, vests, chadries, and numerous other articles. While the embroidery is of high quality, it is usually done on very inferior materials, thus greatly reducing the utility and value of the final product. Sewing of garments is generally done in the bazaars, usually on hand-operated sewing machines. Only one foot-treadle machine was seen in Kandahar, but its operator was enthusiastic in his judgment that it was both more efficient and less tiring.

COTTON GINNING. There are some 10 hand-operated cotton gins in Kandahar. Each can handle about 15 pounds of seed cotton per day. Together they process about 18,000 pounds in some 120 working days, producing an estimated 3 tons of lint. This is about half the production of the Arghandab Valley. The remainder is bought unginned by the Cotton Company and shipped north for processing. The seed produced by these hand gins is sold to camel owners, presumably for use as feed.

HIDE AND LEATHER INDUSTRIES. The bulk of the skins produced are goat and sheep, though there are also minor quantities of cattle and camel hides. Most of these hides are exported after being salted, but a minor part is tanned for internal use. The tanning process is crude and the quality of the product poor. Pomegranate skins are one of the principal tanning materials used.

Most boot and shoe production is done in the bazaars, though some is carried on in the villages. This is a substantial industry. Estimated annual output in the Kandahar area, according to the MKA Industrial Survey, is 360,000 pairs. Local leather is used only for the uppers; sole leather and some of the upper leather is imported. Saddlery is also an important product, much of which is made in the villages.

CERAMICS. Brick production is scattered throughout the area, with a sizable concentration near Kandahar. Both sun-dried and kiln-baked bricks are made. Pottery production is concentrated on the outskirts of Kandahar. The workers show considerable skill and dexterity, though the process of preparing the clay is rudimentary. While some of the clay products are glazed, most are not. Skilled pottery makers receive wages somewhat above the general average, amounting to about 20 afghanis per 100 units for an output of over 200 pieces per day.

WOODWORKING. Woodworking equipment is quite primitive. A common practice is to turn a lathe by hand, with the aid of a bowstring, while guiding the chisel with the toes. A variety of furniture and other products is turned out.

FRUIT DRYING. Production of dried fruit, particularly raisins, is an important industry in the area, especially in the Kandahar region. Raisins are sun-dried, or dried in ventilated raisin houses, of which there are many scattered throughout the district.

HVA INDUSTRIES - LASHKAR GAH. Mention should be made of four handicraft shops set up by the HVA in Lashkar Gah. These include a ceramics plant,

a metal working shop, stone working, and furniture manufacture. The ceramics plant produces such items as plain and fancy tile, electric insulators, pottery, ash trays, pipe, and even toilet bowls. All except the pipe are glazed. The metal shop works on sheet metal and produces sinks and similar simple plumbing fixtures, utensils, and the like. The stoneworking shop cuts building stone from marble quarried near Khugiani. The fourth shop makes various kinds of furniture, including upholstered chairs and settees. No mechanical equipment is used in any of these operations. The products are utilized by the HVA in building and furnishing houses in Lashkar Gah, and some will be used in the mosque and the bank now under construction there.

RECOMMENDATION ON HANDICRAFTS. Handicraft is of great importance to the economy of the Valley and will remain so for many years to come. Much can and should be done to facilitate its growth and improve its product. The first essential is the improvement of tools and techniques, which are primitive and inefficient. *The assignment of one or preferably two ICA specialists to the area on a full-time basis and the establishment of a small mechanized woodworking shop in Lashkar Gah are, therefore, recommended for immediate action.* It is expected that these specialists would perform the following functions:

(a) Make a detailed survey of the handicraft operations being conducted in the area.

(b) Develop a program for improving production methods, such as the introduction of more efficient looms and better methods of preparing clay for ceramics.

(c) Show the artisans how to use these improved methods, establishing training centers in the villages and towns; where better equipment (e.g. improved looms) was required, arrange for its production in the woodworking shop recommended above, as well as in any other available facilities; work out with the HVA appropriate arrangements for providing such equipment to the artisans, probably including a deferred payment plan.

(d) Take steps to explore the possibility of developing export markets for appropriate handicraft products, such as embroidery. This would probably involve, in the first instance, sending selected samples to the United States for appraisal by buyers. If sufficient interest is evinced, they would then be prepared to advise on styling and materials to conform with the pattern of export demand.

The Industrial Specialist on cottage industries now stationed in Kabul on contract with ICA is uniquely qualified for this kind of task, and it is recommended that he be assigned despite the fact that there is considerable demand for his services in Kabul. Anything less than a full-time basis would not be satisfactory.

There are, in addition, a number of further steps that should be taken. Financing is a real problem, particularly in the newly settled areas, where farmers skilled in handicraft do not have the capital required to purchase raw

materials and basic tools. Thus, as noted above, there are many settlers in the Seraj who can make knotted carpets and rugs but who cannot buy the wool and dyes needed to get started. The fundamental answer to this as well as to other cottage industry problems may well be the development of cooperatives, which would include credit among their functions. This will take considerable time to accomplish. As an immediate measure, *it is recommended that HVA extend the necessary credits to qualified artisans, either as cash or raw materials, to enable them to get started.* The general problems involved in farm credit have been discussed in Chapter VII.

In the field of textile handicraft, efficiency and quality can be increased substantially by making factory produced and dyed yarn available. Spinning methods are extremely primitive, and the spinning process takes a disproportionately large share of the labor time of the handworker. While home spinning methods can be improved considerably, it is probable that there could still be a real advantage in using machine-made yarn. It has been recommended above that the Kandahar woolen mill arrange to make yarn available to cottage industry. Similar considerations would apply to the proposed cotton mill.

It seems reasonable to assume that the task of increasing and improving output in types of cottage industry now existing will fully engage the attention of available government and advisory personnel for the time being. This should not, however, preclude consideration of introducing new kinds of handicraft subsequently, such as home paper making, or ornamental marble work. Such new crafts could be introduced among settlers who do not now have any usable skills. This may include, for example, some of the nomads who have moved into Nad-i-Ali.

Finally, it should be borne in mind that the new international airport at Kandahar should make available a significant transit and tourist market for Afghan handicraft, particularly items of relatively low weight such as embroidered textiles. While the extent and nature of this market can only be determined by experience, steps to test it out should be explored as the project nears completion.

Mineral Exploration and Development

As of the present time, there is virtually no mining in the project area, unless digging clay for the ceramics industries be included in this category. There is a marble quarry near Khugiani, previously mentioned as the source of stone for the HVA shop at Lashkar Gah. About 10,000 seers (80 tons) of alabaster are quarried annually from the deposit near Galichah in the Malik Dokand area for use in the modern stone cutting and polishing department of the Hajori Najori plant in Kabul. All kinds of ornamental marble products such as inlaid, multicolored, table tops are produced from this material. This deposit is government owned but may be quarried under permit and without the payment of royalty. The Hajori Najori plant uses its own personnel to direct the extraction. The stone is shipped on camel back. Each camel can carry from 24 to 48 seers (384 to 768 pounds) de-

pending on its size. On this basis, it may be assumed that a year's output represents about 300 camel loads.

With these minor exceptions, the mineral resources of southern Afghanistan are not only largely untapped but also largely unexplored. As indicated in the MKA Industrial Survey, there is a considerable probability of valuable mineral deposits, including petroleum, in and near the Valley.

The absence of any intensive exploration efforts probably reflects, at least in considerable part, the existing legal structure. It is understood that the prospector who finds some valuable mineral can neither stake a claim to its development nor count upon receiving any bonus for his find. Title to the mineral remains with the government, though apparently the finder may be able to participate in the operation of any mine that is developed. Obviously, this does not provide anything like adequate incentive to mineral exploration. *It is, therefore, recommended that a revision of the prospecting and mining laws be given very serious consideration.* Without indicating in detail the lines which such revision should take, it seems clear that the finder of any valuable minerals should receive a substantial reward in the form of exclusive mining rights, bonus, or similar preferment. It should be borne in mind, also, that commercial prospecting on any substantial scale is a costly process and that the rewards offered must be sufficient to induce the assumption of the risks and costs involved.

In view of the acute shortage of fuel in the area, the development of local fuel sources assumes primary importance. The Helmand Valley Industrial Survey conducted by MKA found no evidence of coal deposits in or near the area but did report geologic formations that may be oil bearing in the "Nak Sedimentary Basin" south of Gardez. (See Plate VI) It is understood that the Government of Afghanistan has approached the Embassy and ICA officials regarding support for further exploration and survey in this region, including the possibility of interesting an American oil company in the project.

It is suggested that ICA should endeavor to elicit such interest on the part of an American company. If this effort proves successful, the State Department and ICA could then assist in the negotiation of an appropriate agreement between the company and the government, possibly including some form of investment guarantee.

It may turn out that further preliminary exploration is needed before any company would be willing to undertake the risks involved. Under such circumstances, *it is suggested that ICA might give favorable consideration to advancing some limited funds on a loan basis for additional surveys,* subject to agreement by the government as to the basis on which actual development would be undertaken if the survey results prove favorable.

TRANSPORT

Greatly improved transport is needed to facilitate not only industrial but also agricultural development. While a comprehensive program will take many

years to achieve, two immediate steps are urgently needed. The first is improvement of the Kabul-Kandahar road, which is the principal traffic artery connecting the Valley with its major internal markets and material sources. The second is the introduction of animal-drawn wheeled transport, to replace gradually the present primitive system of moving goods on the backs of camels and donkeys. Improvement of the road west to Farah and Herat, while ultimately essential, is regarded as meriting a later priority.

Reconstruction of Kandahar-Kabul Road

The road from Kandahar to Kabul, about 325 miles in length, is impassable during the spring runoff season and frequently impassable during the winter because of snow. During the dry season, by making many detours at stream crossings, where structures have been washed out, the road can be covered in 12 hours of steady driving. Most travellers break the trip at Muker, the halfway point, and take two days.

The road was originally built to good alignment and grade. Going north from Kandahar, it follows the Tarnak River to Ghazni and then climbs over the divide into the Kabul River drainage area. None of the grades are excessive, and the graded width of the roadway is ample for two-lane traffic.

The road crosses many streams, large and small, and an innumerable number of small irrigation ditches or juies. At the stream crossings, stone arch culverts were originally built and in some places a series of arches up to six or eight. The heavy masonry piers supporting the arches were apparently not carried to any great depth. The effect of the arches and the piers has been to restrict the area of the natural waterway and, as a result, practically every bridge and culvert has been destroyed over the years by undermining of the abutments.

The juies are carried under the roadway in small stone culverts, which universally cause a hump or ridge in the road profile. This, of course, is a fault which could readily be corrected by additional grading of the roadway or reconstruction of the culverts with a flatter cross section.

It would be desirable to improve this road at least to the point where it will be usable in all weather. The principal item of expense will be the rebuilding of the structures of which there are nearly a thousand. In places the roadway should be raised in grade above the adjoining land to provide better drainage and to insure protection against flooding. Roadway grading will be simple and inexpensive, except that satisfactory material for surfacing and the water needed for binding will be difficult to obtain in many places, particularly for about a 100-mile stretch between Muker and Ghazni.

Without a survey and investigation of the drainage crossings and a profile of the road grade, an estimate of the cost of reconstruction is difficult to make. MKA engineers at the request of the Survey Team submitted a preliminary estimate for grading, macadam surfacing, and structures amounting to $14 million.

In view of this high cost and of competing demands for the funds and resources available, and taking into account the relatively limited present volume of traffic over the road, no specific recommendation for immediately initiating this project is made. There is no doubt that this work will ultimately have to be undertaken, since this is a major artery between the two largest cities in Afghanistan and constitutes the principal means of communication between the Helmand Valley and other parts of the country. As economic activity in the Valley and throughout Afghanistan expands, the volume of traffic is certain to multiply and improvement of the highway will become imperative. The timing of the project should, however, be related both to the growth of actual and potential traffic and to the relative urgency of other developmental demands for funds and resources.

Wheeled Transport — Surplus Military Equipment

The absence of animal-drawn wheeled transport, described above, seriously retards the Valley's economic development. It is understood that ICA is considering procurement of a large number of carts and wheels from surplus military equipment. This project also includes acquiring substantial quantities of other surplus items, including agricultural and other hand tools, woodworking equipment, electric and treadle sewing machines, and the like. Under the present proposal, the Afghan Government would pay the necessary freight charges. While these items would be for use in all parts of Afghanistan, it is assumed that the Valley would get its full share. A program of this kind would appear to have considerable merit, both in providing the wheeled transport now lacking and in supplying a fairly wide range of miscellaneous tools and equipment. If, for any reason, it is not consummated, alternative steps for constructing animal-drawn carts in the Valley should be undertaken.

Chapter IX
FUNDAMENTAL, ECONOMIC AND GENERAL CONSIDERATIONS

GENERAL EFFECT OF DEVELOPMENT PROGRAMS

Any substantial program of national economic development inevitably imposes serious strains upon the economy of the country undertaking it. Internally, the expenditure of large sums for development projects results in expansion of purchasing power with attendant increase in consumer demand. The goods or services to be produced by the projects cannot become available until the development is completed and perhaps not for some time thereafter. Consequently, in the interval, the consumer demand is unsatisfied, and a threat of inflation is immediately created. Ordinarily, it is impossible to raise taxes in an underdeveloped country sufficiently to absorb more than a small fraction of the increase in consumer incomes and, in most cases, any drastic tax increases would put a serious damper on private investment in the development program.

In principle, it might be possible to offset the inflationary pressures by importing larger quantities of consumer goods. In practice, however, this is rarely feasible to a sufficient degree. The requirements of development necessarily involve large expenditures of foreign exchange for machinery, equipment, and materials of all kinds, as well as for the services of foreign companies and technicians. Eventually, these should be offset by increased production of goods for export and the replacement of certain kinds of imports by domestically produced goods. Here again there is a substantial time lag between the expenditure and the benefit. Consequently, even with substantial foreign loans or grants, the foreign exchange position is unlikely to permit greatly increased importation of consumer goods. Often, in fact, far from liberalizing imports, it becomes necessary to restrict them in order to conserve foreign exchange.

Furthermore, fiscal regulations in most countries prescribe the maintenance of a minimum reserve of precious metals and foreign exchange against the issuance of internal currency. If the foreign exchange position worsens, the permissible amount of currency issue necessarily declines. This often makes it essential either to slow up development expenditures or to modify the required reserve ratio. While this does not appear to constitute an immediate problem for Afghanistan, it may cause difficulties later.

In short, therefore, any ambitious development program necessarily involves difficult problems of fiscal management and a serious danger of internal inflation. Few, if any, countries that have embarked on such programs in recent years have escaped these difficulties, and Afghanistan is not likely to be an exception. The government has already engaged in substantial deficit financing in order to support its development to date. It is now planning to embark on a vastly enlarged

sources. After arrival in Afghanistan on July 19, 1956, where Mr. Fluker joined the team, six weeks were devoted to field examination of irrigation works, agricultural land, farming practices, local customs, industrial and marketing plants, and the activities of the agencies engaged in developing and administering the program.

Several days were spent at Kabul, the capital, in conference with Afghan officials. Conferences were also held with the governors of Kandahar and Girishk Provinces. Both the Central and Provincial Governments provided answers to extensive questionnaires prepared by the Survey Team. Members of the Survey Team also interviewed officials of the ICA, the Helmand Valley Authority, the American construction company and other agencies, as well as many farmers, merchants, industrialists, financiers and others. In general, the team worked in small groups or as individuals so as to cover thoroughly all of the specialized fields involved in the survey. The whole team participated in an aerial reconnaissance of the Helmand Valley and Chakhansur Basin by means of the Air Attache' plane kindly made available by the American Embassy.

Following their return to the United States, various sections of the report were prepared by team specialists in their respective fields, and the various sections were then integrated and coordinated and finally approved by all members as a joint report.

ACKNOWLEDGMENTS

The Survey Team gratefully acknowledges the universal cooperation and assistance it received from the Royal Government of Afghanistan, from private Afghans in all walks of life, from the American Embassy and the United States Operations Mission, and from Morrison-Knudsen Afghanistan, Inc. Without such cooperation, it would not have been possible to perform the task assigned.

So universal was the cooperation that it would be impossible to mention more than a very few of those to whom special thanks are due. We are particularly grateful to His Royal Highness, Prince Lemar-e-'Ali Sardar Mohammed Na'im, Deputy Prime Minister and Minister of Foreign Affairs, and to their Excellencies Abdul Malik, Finance Minister and Dr. Mohammed Yusuf, Minister of Mines and Industry and, of course, to His Excellency Abdullah Malikyar, President of the Helmand Valley Authority, whose assistance was only matched by his warm hospitality. Their Excellencies Abdul Ghani, Governor of Kandahar, and Sadat Khan, Governor of Girishk, extended invaluable help, and the entire staff of the Helmand Valley Authority, particularly Vice-Presidents Dr. Abdul Kayeum and Dr. Abdul Wakil, rendered unstinting cooperation.

We are most grateful, also, for the advice and assistance of Ambassador Sheldon T. Mills and Mr. Robert Snyder, Chief of the USOM/A, and their respective staffs; Mr. T. Y. Johnston, Project Manager for Morrison-Knudsen Afghanistan, Inc., and his subordinates; and Mr. Karl O. Kohler, Jr., Technical Adviser to the Helmand Valley Authority.

nation-wide program, for which it is apparently confident of finding the necessary financial resources. The government is aware of the threat of inflation resulting from this policy but hopes that economic development will be so rapid that rises in productivity will absorb most of the inflationary pressure.

The Helmand Valley development program must, therefore, be assessed in terms of this setting, as well as in relation to certain broad general problems, which will be described at the end of this chapter.

INTERNAL FINANCE

Afghanistan's National Income

The primary economic objective of the government is, of course, to raise the national income and the general standard of living above their present low levels. The government estimates that the total national income in 1953-54 was 12.5 billion afghanis or roughly 1,000 afghanis per capita, assuming a population of 12 million persons. The manner in which this estimate was compiled is shown in Table No. 8, which consists of the simple summation of the estimated income of the various economic sectors. (This method of calculation suggests that the figure probably represents gross national product rather than national income but, in view of the limited value of depreciable capital in Afghanistan, the difference is probably not large and may be offset by failure to take all income sources into account.)

The estimated per capita income of 1,000 afghanis would be equivalent to about $50 at the official rate of exchange. In terms of purchasing power parity, however, this is undoubtedly a considerable over-estimate. A more realistic valuation would put the figure at not over $35 per capita per annum. This is quite low even in relation to the level in other underdeveloped countries in the area and underlines the necessity for a sound program of development.

As indicated in Table No. 8, agriculture accounts for 72 percent of the total national income. While this ratio may be expected to decline as industrialization progresses, it is evident that a major share of any increase during the next few decades must come from agriculture. This serves to point up the need for an agricultural development program such as that planned for the Helmand Valley.

Five-Year Plan

Parliament has just approved Afghanistan's first comprehensive Five-Year Plan for economic development. While a summary text of the plan and its objectives was not available, certain summary tables presenting it in broad outline were made available to the Survey Team by the government. On the basis of these data and discussion of them with government officials, two facts of importance to the Valley program emerge.

In the first place, the plan includes provision for various specific Valley projects, in addition to the more general programs in which it may be assumed the Valley will share. Thus, the plan includes development of hydro-electric power at Arghandab and Girishk, remodeling of the Kandahar Woolen Mill, a tannery

at Kandahar, and the development of fruit preservation facilities which presumably would be located in the Kandahar area. The Kajakai Dam and Boghra Canal, Helmand Valley agriculture and irrigation, and the Kandahar-Kabul and Kandahar-Spin Baldak roads are specifically mentioned, as well as provision for the Kandahar International Airport. In addition, portions of the funds for general purposes, such as education, community development, meteorological work, and mining, will undoubtedly be allocated to the Valley.

In the second place, the Five-Year Plan will impose heavy demands upon Afghanistan's total resources. Proposed aggregate expenditures for the five-year period amount to some 7.6 billion afghanis, of which about 4.4 billion are expected to require foreign exchange, equivalent to about $180 million at the exchange rates applicable to each type of expenditure. The remainder, or more than 3.2 billion afghanis, will be in local currency.

The local currency requirements are estimated at 542 million afghanis for 1956-57, ranging thereafter between 614 million and 720 million afghanis an-

Table No. 8

ESTIMATED NATIONAL INCOME OF AFGHANISTAN
1953-1954

	Millions of Afghanis		*Percent*	
Agricultural Products				
Wheat	4,085		32.7	
Fruits	1,020		8.2	
Karakul, Hides and Wool	680		5.4	
Livestock	1,000		8.0	
Dairy	1,000		8.0	
Cotton	380		3.0	
Others	835		6.7	
Sub-total		9,000		72.0
Industrial and Cottage Industry Products				
Textiles	220		1.8	
Electricity	120		0.9	
Carpets and Rugs	200		1.6	
Sugar, Mining, Building Material and Others	260		2.1	
Sub-total		800		6.4
Trade and Other Services		1,000		8.0
Wood		800		6.4
Miscellaneous		900		7.2
National Income		12,500		100.0

nually. This will be three to four times the rate of local currency development expenditures during the last fiscal year. The currency in circulation in Afghanistan has been increasing very rapidly, and there seems to be no way in which internal government revenues can be augmented at a rate even approximately commensurate with the planned increase in outlay. The inflationary potential of this plan is, therefore, clearly evident, and the Valley cannot hope to escape the impact of whatever inflation may occur.

In short, the Five-Year Plan as now laid out will have both beneficial and adverse effects upon the Valley's program. On the positive side, it will provide directly for at least part of the projected Valley development, and the general economic expansion of the country will mean a further important stimulus to the economy of the Valley. On the other hand, the very heavy demands upon national resources and the inflationary threat posed may well increase the difficulty of attaining the desired objectives of the Valley development program.

Government Finances

While the Five-Year Plan is scheduled to begin during the current fiscal year (1956-57), it seems unlikely that its effect will begin to be felt until the following year. Even prior to its inception, however, Afghanistan's internal finance is reflecting the strain of the much more modest program pursued to date. As shown in Table No. 9, budget expenditures over the last four years have risen by about 60 percent from approximately 830 million afghanis in 1952-53 to the 1.3 billion afghanis budgeted for 1955-56. During the latter year, 80 percent of these expenditures were shared equally by two categories: (1) public works, irrigation and agriculture; and (2) national defense and police. Expenditures for both these groups have approximately doubled since 1952-53. The outline of the 1956-57 budget is not yet available, but government officials estimated that total expenditures would be slightly higher than 1.3 billion afghanis. This is a little over 10 percent of estimated national income. While this ratio may not, in itself, be excessive, it is difficult for a nation at a relatively early stage of economic development to produce government revenues adequate to defray this rate of expenditure.

It is true that, during the last four years, ordinary revenues have risen by about the same percentage as expenditures. As shown in Table No. 9, customs account for about 40 percent of total revenue throughout the period and have increased at about the same rate as the total. Receipts from excise duties and stamps and from government enterprises have more than doubled.

While revenues have thus risen, substantial deficits have, nevertheless, been incurred in each of the past four years. These have ranged from 26 percent of expenditures in 1952-53, through relatively minor deficits of about 7 percent in the two following years, back to 24 percent in 1955-56. The cumulative four-year deficit of close to 900 million afghanis was covered by both external and internal borrowing, the former contributing about 420 million afghanis and the latter slightly under 480 million afghanis. The internal borrowing principally took the

Table No. 9
BUDGET RECEIPTS AND EXPENDITURES

(Millions of Afghanis)

	1952–53 Actual	*1953–54 Actual*	*1954–55 Actual*	*1955–56 Estimated*
I. Revenue				
Customs	243.8	301.7	401.2	401.3
Income Tax	80.7	98.5	97.6	105.0
Land Tax	76.7	77.0	77.0	76.4
Livestock Tax	33.7	31.6	41.0	40.7
Excise Duty and Stamps	43.7	37.2	112.2	103.2
Government Enterprises	59.6	79.4	96.3	143.6
Other Taxes and Monopoly Income	149.2	138.8	108.0	141.9
Sub-total	613.9	774.6	964.1	989.1
Internal Borrowing	85.5	98.9	125.7	165.9
External Borrowing	152.6	59.5	60.3	146.0
Grand Total	852.0	933.0	1,150.1	1,301.0
II. Expenditures				
Public Works, Irrigation and Agriculture	279.4	218.3	281.7	532.7
National Defense and Police	249.0	280.9	417.7	527.9
Education	77.1	83.1	54.2	79.5
Food Storage and Public Health, etc.	138.0	162.3	152.0	81.7
Government Enterprises	86.7	93.8	24.4	45.7
International Bank				33.5
Sub-total	830.2	838.4	1,030.0	1,301.0
Cash Balance	21.8	94.6	120.1	
Grand Total	852.0	933.0	1,150.1	1,301.0

form of the issuance of additional currency. Total borrowing in 1955-56 was about 312 million afghanis and government officials expect that this figure will rise to some 400 million afghanis in 1956-57.

In common with other countries in the area that have major development programs, Afghanistan faces very serious difficulty in increasing its revenues at a rate commensurate with expenditures. With customs forming so large a proportion of total revenue and with increases in customs duties likely to add to the inflationary pressures, the problems of fiscal management are far from simple. The limited extent of industrial development augments the difficulties of increasing internal revenues. Discussions with government officials indicated that consideration is being given to measures to increase customs receipts and land taxes by as much as 300 million afghanis in the first year of the Five-Year Plan, presum-

ably 1957-58. It seems very doubtful, however, that such an increase can, in fact, be achieved in the near future. Actually, estimated revenues for 1956-57 show a small decrease to 963.5 million afghanis as compared with the 989.1 million figure for 1955-56.

Relative Expenditures in the Helmand Valley

The government's annual expenditures in the Helmand Valley, as shown in Table No. 10, have represented a very substantial, though declining, proportion of total budgeted expenditures. For the four years, 1952-53 to 1955-56, the average annual outlay has been about 191 million afghanis with expenditures increasing each year since 1953-54. As a percentage of total budgeted expenditures, however, the ratio has declined from 23 percent in 1952-53 to 16 percent in 1955-56. The expenditures shown are all inclusive, including such budgeted items as that for the Kandahar International Airport in 1955-56, but they represent, in the main, actual development expenditures for the Helmand Valley.

Table No. 10

TOTAL AFGHAN BUDGETED EXPENDITURES FOR ALL PURPOSES AND DEVELOPMENTAL EXPENDITURES ON THE HELMAND VALLEY

(In Millions of Afghanis)

Year	*Total Budgeted Expenditures For All Purposes*	*Helmand Valley Expenditures Amount*	*Percent of Total*
1952–53	830.2	192.6	23
1953–54	838.4	162.2	19
1954–55	1,030.0	201.1	20
1955–56	1,301.0	207.4	16
Totals	3,999.6	763.3	19

Figures for Afghanistan's total development expenditures are available for the last three years only. These are compared with expenditures for the Helmand Valley development program (excluding the Kandahar airport) in Table No. 11.

Table No. 11

DEVELOPMENT EXPENDITURES OF THE GOVERNMENT OF AFGHANISTAN

(In Millions of Afghanis)

Year	*Total*	*In the Helmand Valley Amount*	*Percent of Total*
1953–54	216	162	75
1954–55	320	201	63
1955–56	351	188*	54

* (Exclusive of 19.4 million afghanis pledged for international airport.)

It is evident that a large share of the government's total development expenditure has gone to the Valley during this period, although the percentage of the total has declined sharply from 75 percent in 1953-54 to 54 percent in 1955-56.

While this ratio may appear large on its face, there is an important factor which should be borne in mind in its interpretation. Development expenditures in the Valley during this period have been almost entirely by the government, largely because the local economy had not yet reached a stage that would attract substantial private industrial investment. In contrast, there has been heavy private investment during the same period in Kabul and northern Afghanistan in a considerable range of industrial projects. In the absence of figures showing the extent of this private investment, no direct comparison is possible, but it can be safely assumed that, if total investment in the Helmand Valley were compared with the sum of government and private investment in other parts of Afghanistan, the apparent disproportion would be very greatly reduced. Moreover, the very fact that the Valley has lagged behind other parts of Afghanistan in its economic development points to the need for heavier investment in the region in order to insure sound and balanced national development.

Receipts from the Helmand Valley

There is ample evidence that the government's investment in the Valley is already beginning to pay off in terms of increased revenues. Production estimates and export figures show clearly that agricultural output in the Valley has risen as a result of the larger and more stable water supply which has both increased the productivity of land previously under cultivation and expanded the acreage of new land cultivated. Between 1952-53 and 1955-56, exports of fresh fruit rose from less than 20 million kilograms to almost 29 million kilograms while value almost doubled. During the same period dried fruit exports rose from 234 million afghanis to 420 million afghanis. A large fraction of both of these exports originate in the Valley.

Table No. 12 shows the increase in the ordinary revenues of the central government from the Helmand Valley area since 1951-52. While the rate of increase is about the same as for the nation as a whole, it is clear that it reflects increasing economic activity in the area which was made possible by the development program. Moreover, this increase occurred without any specific efforts on the part of the government to obtain direct revenues from its program in such form as levies for improved water supply. The indicated decline in revenue for the year 1955-56 is believed to be the result of the interruption of exports to Pakistan caused by the closing of the border between May 21 and November 30, 1955.

Currency

Reflecting the substantial and continued budgetary deficits and the necessary internal borrowing, currency in circulation has risen by over 90 percent in the past five years, from 1,098 million afghanis in the second quarter of 1951-52, to 1,993 million as of August 13, 1956. Most of this increase has occurred since the

third quarter of 1954-55. The trend of bank notes in circulation since 1951-52 is shown in Table No. 13.

The total internal debt, as of the end of 1955-56, is reported at 675 million afghanis. Almost all of this represents borrowing from the Central Bank, payable in 15 equal annual installments beginning in 1960-61 at 4 percent interest.

Table No. 12
CENTRAL GOVERNMENT ORDINARY REVENUES FROM THE HELMAND VALLEY AREA

(In Millions of Afghanis)

Province	*1951–52*	*1952–53*	*1953–54*	*1954–55*	*1955–56*
Kandahar)			112.54	154.90	133.80
)	72.88	87.60			
Girishk)			1.75	1.86	2.06
Farah	3.05	3.21	4.50	7.02	3.89
Total	75.93	90.81	118.79	163.78	139.75

Table No. 13
TOTAL BANK NOTES IN CIRCULATION DURING SECOND QUARTER OF FISCAL YEAR

Year	*Afghanis*
1951–52	1,098,000,000
1952–53	1,098,000,000
1953–54	1,133,800,000
1954–55	1,234,800,000
1955–56	1,799,800,000
1956 (August)	1,993,000,000

Bank Deposits

The position of Afghan banks has expanded in line with the increase in currency. Bank advances to, and investment in, the private sector have risen from 971 million afghanis in 1954-55 to 1,792 million in 1955-56. The great bulk of this financing was in the hands of Da Afghanistan Bank and the Bank-i-Mille. While time deposits have changed little, demand deposits of private and government enterprises, which were 173 million afghanis in 1953-54, rose to 488 million in 1954-55 and to 522 million in 1955-56. Government demand deposits in all banks, other than those of government enterprises, remained relatively stable at around 250 million afghanis over the same period of time.

Prices

While the initial impact of deficit financing and currency expansion is already apparent in the Afghan economy, the full impact on prices is yet to be felt, particularly that reflecting the heavy deficit financing effected in the last 18 months. Official government price statistics are available only through 1954-55 and, to the extent they are representative, show relative stability of the general price level up to that time, as indicated in Table No. 14. It would be reasonable to expect, however, that the major impact of the continued deficit financing would be felt more recently, and there are indications that this has, in fact, occurred. Thus the price of tea at Kabul, Kandahar and Mazar-i-Sharif has advanced almost 70 percent in the three years ending in 1955-56, rising from 291 afghanis per seer to almost 500 afghanis per seer during this period. In Kandahar, the price of cooking oil apparently advanced by 150 percent over the last five years, while the price of wheat rose an estimated 25 percent.

Table No. 14
PRICE INDEXES
(1954 - 46 = 100)

Item	*During Fiscal Year Ending* 1947	1948	1949	1950	1951	1952	1953	1954	1955
Food	119	89	107	118	130	128	127	125	124
Clothing	114	117	160	188	187	217	214	210	209
Fuel & Heating	110	109	116	145	154	153	153	152	152
Rent	100	100	180	180	140	120	120	118	117
Miscellaneous	123	128	114	141	161	160	158	154	154
Average	113	109	155	154	154	156	154	152	151
Weighted Index	116	122	125	142	150	155	153	151	150

In the last year alone (1955-56), wages of common labor have gone up about 25 percent. Since wages for common labor in an economy at the stage prevailing in Afghanistan are usually close to the subsistence level, this sharp increase probably reflects, at least in considerable part, a rise in basic living costs.

FOREIGN TRADE AND EXCHANGE

Exports and Imports

EXPORTS. The value of Afghanistan's exports, measured in afghanis, was more than 40 percent higher in 1954-55 and 1955-56 than it had been in the two preceding years. As shown in Table No. 15, virtually all categories of exports increased during the period, with the notable exception of cotton. In terms of destination, the sharpest increases up to 1954-55 (the last year for which data were available) were to India, the United States, and the United Kingdom.

Table No. 15

AFGHANISTAN'S EXPORTS - 1952-53 TO 1955-56

PRINCIPAL COMMODITIES AND COUNTRIES OF DESTINATION

(In Millions of Afghanis)

Commodity	*1952–53*	*1953–54*	*1954–55*	*1955–56*
Dried Fruit	234	242	432	420
Fresh Fruit	65	56	115	118
Karakul	157	166	308	292
Wool	178	149	151	248
Cotton	300	169	247	141
Hides and Skins	9	65	24	30
Carpets	22	31	47	76
All Other	47	72	79	127
Totals	1,012	950	1,403	1,452
Countries of Destination				
India	270	371	528	not available
United States	210	232	297	
Soviet Union	316	120	271	
United Kingdom	31	39	124	
Pakistan	63	36	60	
West Germany	55	54	54	
Japan	27	71	44	
All Other	40	27	25	
Totals	1,012	950	1,043	

Table No. 16 shows a breakdown of exports for 1954-55 by commodity and destination. This breakdown casts light both on the nature of Afghanistan's main export markets and on the type of currency earned by each major kind of export. It is evident that the market for fresh fruit is entirely, and that for dried fruit is largely, in India and Pakistan and that fruit forms the great bulk of the total exports to these two countries. The rupees obtained in India are convertible into sterling. Exports to the USSR, mainly cotton and wool, create barter credits. Direct dollar earnings from the United States come principally from karakul but also from carpet wool. While more than half the value of cotton exports was obtained on shipments to the USSR, 43 percent was sold competitively on the world market, mostly to West Germany and Japan.

The values shown are all in afghanis and include many different exchange rates, ranging from an average of about 21 afghanis to the dollar for karakul and an average of about 26 for wool and cotton to the free market rate of over 50 afghanis to the dollar for fruit. The average exchange rate for all transac-

tions in 1955-56 was about 32 afghanis to the dollar (derived by dividing the afghani export figure of 1,452 million for 1955-56 by the reported dollar total of $45.4 million.) It is worth noting that, by applying the specific exchange rates involved, karakul rather than fruit is by far the largest earner of foreign exchange as well as of dollars as such.

Table No. 16
EXPORTS - 1954-55, BY COMMODITY AND COUNTRY OF DESTINATION

(In Millions of Afghanis)

				Country of Destination					
Commodity	*India*	*Pak.*	*USSR*	*US*	*UK*	*W. Ger.*	*Jap.*	*Others*	*Totals*
Dried Fruit	396	18	11	6	a			1	432
Fresh Fruit	85	30						a	115
Karakul				234	73			1	308
Wool	a		92	54	4	1		a	151
Cotton	3	a	139		14	44	44	3	247
Hides & Skins	18	a	5		a	1			24
Carpets	3	a		1	31	4	a	8	47
All Other	23	12	24	2	2	4		12	79
Totals	528	60	271	297	124	54	44	25	1,403

a—denotes less than 500,000 afghanis.

IMPORTS. Imports have also risen steadily from 1952-53 to 1955-56, from 732 million to 1,392 million afghanis. The principal imports, which are also those showing the largest increases in value, are textiles, particularly cotton and woolen cloth, tea, and automotive products. The USSR led in both total imports and textile imports in 1954-55, closely followed by India. India and Pakistan were the main sources of tea and the United States of automotive products. Table No. 17 shows imports of principal commodities for 1954-55 and 1955-56, as well as a breakdown by country of origin for 1954-55.

As in the case of exports, caution must be used in interpreting these afghani import values because of the multiple exchange rate system. Thus, textiles constituted about 60 percent of total imports from India in 1954-55. These were mostly paid for by private importers who obtained foreign exchange from fruit exporters at the prevailing open market rate of about 50 afghanis to the dollar. Most of the imports from Japan were also textiles, which were paid for on a similar basis by converting the rupee proceeds of fruit exports. On the other hand, machinery imports, both governmental and private, and petroleum imports by the Monopolies Department were paid for at a more favorable rate of exchange.

Chapter II
THE HELMAND VALLEY PROJECT

NATURE, LOCATION AND GENERAL PLAN

General

The development of the Helmand Valley, which has been actively under way for the past 10 years, is primarily an irrigation and land development project with incidental provisions for flood control and power development. It also embraces broad programs for improvements in agriculture, settlement of new farmers, and rural development, including health and education.

The Helmand Valley

The Helmand Valley with its numerous tributaries, located in the southwesterly portion of Afghanistan, occupies nearly half of the total area of the country. The Helmand River rises in a westerly extension of the Hindu Kush mountains west of Kabul and runs southwesterly for about 600 miles to an inland sink known as the Seistan or Chakhansur Basin, which straddles the border between Iran and Afghanistan. The Arghandab River, the chief tributary of the Helmand, passes within a few miles of Kandahar, the principal city in the Valley, and joins the main river some 250 miles above its outlet. Most of the flow in the rivers comes from melting snows in the high mountains, which rise to elevations of 12,000 feet or more. Main rivers and watershed areas are shown on Plate I. (Frontispiece)

The Valley is in the temperate zone between latitudes 30 degrees and 34 degrees north. Land elevations vary from about 1,500 feet above sea level in the Seistan Basin to about 3,000 feet at the base of the mountains surrounding the upper part of the Valley. Average yearly rainfall in the valley areas is about four inches, practically all of which occurs between January 1 and May 1. Temperatures range from 18 to 110 degrees Fahrenheit, with occasional lows of 6 to 10 degrees. Humidity is normally low, and strong dry winds frequently blow in the westerly portion of the Valley during July and August.

Little vegetation is to be found except in bottom lands along the rivers where irrigation is practiced or winter flooding occurs. Much of the area is desert, with the scant ground cover fully utilized by grazing livestock. The basin as a whole is similar in climate and appearance to the Mojave Desert in southeastern California or to the southerly portion of Arizona.

Access to the Helmand Valley is normally by rail from Karachi in West Pakistan to Chaman near the Afghanistan border and thence by improved road to Kandahar. Roads into the Valley from the capital at Kabul and from Farah and Herat to the west are in very poor condition and transportation costs are high. Three air lines make calls at the Kandahar airport two or three times a week.

Table No. 17
AFGHANISTAN'S IMPORTS - 1954-55 AND 1955-56
PRINCIPAL COMMODITIES AND COUNTRIES OF ORIGIN

(In Millions of Afghanis)

Commodities	*1954–55*	*1955–56*
Cotton Goods	357	544
Rayon Goods	133	208
Tea	102	169
Autos and Trucks	96	54
Metal Products	34	48
Petroleum Products	33	46
Sugar	34	31
Leather and Products	16	23
Clothing	40	Not Available
All Other	187	269
Total	1,032	1,392
Country of Origin		
USSR	264	Not Available
India	255	
Pakistan	170	
Japan	150	
United States	125	
All Other	68	
Total	1,032	

Balance of Payments

These exchange rate complications apply equally to Balance of Payments calculations. It is obviously difficult to compute a trade balance from gross import-export data expressed in terms of afghanis which represent a wide range of different conversion rates. Afghan officials, however, maintain that there was a direct equivalence between the total value of imports and exports at any given rate so that of necessity total import values and total export values are also expressed in common terms. For 1955-56, fortunately, the Balance of Payments has been calculated in terms of United States dollars.

Computed in afghanis, a surplus on merchandise trade was earned in each of the four years 1952-53 to 1955-56, fluctuating erratically between a high of 371 million afghanis in 1954-55 and a low of 36 million afghanis in 1953-54, as shown in Table No. 18.

Table No. 18
EXPORTS, IMPORTS AND BALANCE ON MERCHANDISE TRADE
1952-53 To 1955-56

(In Millions of Afghanis)

Year	*Exports*	*Imports*	*Merchandise Export Surplus*
1952–53	1,012	732	280
1953–54	950	914	36
1954–55	1,403	1,032	371
1955–56	1,452	1,392	60

As may be expected, Afghanistan had an adverse balance on invisibles in each of these years. This reduced the surplus on current account to some 20 million afghanis for the year 1953-54 and 335 million afghanis for 1954-55. For the year 1955-56, there was a debit balance on current account of about $6 million, indicated in the summary prepared by the government which is reproduced in full as Table No. 19.

Gold, Silver and Foreign Exchange

Table No. 20 shows Afghanistan's holdings of precious metals and its foreign exchange assets and liabilities for the years 1953-54 to 1955-56. It is evident that the great bulk of Afghanistan's reserves is represented by its gold and silver holdings, which have not changed over the past three years. Its foreign exchange assets and liabilities have fluctuated erratically during this period and are quite small in relation to its precious metal holdings.

As may be apparent from the table, the silver holdings have been valued at about 72 cents an ounce. Government officials observe that this is about 20 percent below the United States market value and justify this discount on the basis of the cost of "the refining and transport which would be involved in the sale of such silver."

Currency Reserve

These assets of precious metals and foreign exchange serve as a backing for the issue of internal currency. Under the present statute, reserves of 30 percent are required against the total of note issue plus demand deposits. Government officials stated in August 1956 that the ratio was 32.14 percent, or very close to the minimum legal requirement. It was expected in August 1956, however, that an amendment to the statute, which was then before Parliament, would be approved shortly. This amendment would permit the application of the reserves against the 30 percent requirement for bank note issue only, without including demand deposits. With this change, present reserves would constitute 37 percent of the total bank note issue. However, government representatives state that it actually represents 40.19 percent of the currency in circulation, since they subtract from the total issue almost 500 million afghanis in the coffers of Da Afghanistan Bank, half of which is said to be worn out currency due for retirement.

Table No. 19

AFGHANISTAN'S BALANCE OF PAYMENTS 1955-56

Items — In Thousands of U. S. Dollars	Credit	Debit
1. Merchandise	45,410.884	34,852
1. (1) Exports (FOB) & Imports (CIF)		
1. (2) Imports not included in Customs Statistics		
(a) Imports for HVA, including Services		3,600
(b) Wheat Imports under U. S. grant		
(c) Commodities imported under ICA		350
(d) Import for Municipality		1,500
(e) Import for other projects		772
(f) Import for Cement Factory		1,312
2. Foreign Travel		
2. (1) Transportation		
2. (2) Afghan Nationals Travelling Abroad		
(a) Official		203
(b) Haj		550
2. (3) Foreigners Visiting Afghanistan	17.1	
3. Insurance (Aryana Planes)		14
4. Investment Income		
4. (1) Net Earning of Foreign (Companies)		500
4. (2) Interest on External Public Debt		742
5. Government Expenditures (Including Ministry of Defense, Foreign Office & Other Ministries)	1,200	8,500
6. Miscellaneous (Film rentals)		156
7. Donations		
(a) U. S. Wheat and Flour Grants		
(b) ICA Commodities	350	
(c) Afghan Red Crescent Subscription & Donations		2
8. Air Lines		158
Official and Banking Institutions		
9. Long term Capital		
9. (1) Official Loans for disbursement basis	7,134	
9. (2) IBRD		2,000
10. Short Term Capital and Deposit		
10. (1) Credit received or extended on barter & clearing agreement	2,844	
10. (2) IBRD	1,800	
11. Net Acquisition or Disbursement of (a) Gold (no change in gold holding except subscription to IMF in 1955–56)	58,755.1	55,211
Items not included above, errors and omissions	1,200.00	4,744.1
	59,955.1	59,955.1

A further possible element of flexibility lies in the fact that the government now calculates its foreign exchange reserves on the basis of 16.8 afghanis to the dollar. This is the lowest of all rates applied by the government to various transactions under its multiple rate system and is about 20 percent under the official exchange rate.

Approximately $50 million of reserves at 16.8 afghanis to the dollar is equivalent to 840 million afghanis. Under the expected amendment of the statute, this would provide cover for a note issue of 2.8 billion afghanis, as compared to the just under 2 billion reported to be in circulation in the middle of 1956. While this leaves a substantial margin as of the present time, it should be borne in mind that the currency issue has increased by about 50 percent since the third quarter of 1954-55 and that continued expansion at the same rate would endanger maintenance of the legal requirement by some time in 1958. Further flexibility could, of

Table No. 20

PRECIOUS METAL AND FOREIGN EXCHANGE AND LIABILITIES

(In Thousands of Dollars)

	1953–54	*1954–55*	*1955–56*
1. Precious Metals			
Gold (1,206,055.845 ounces)	42,211.9	42,211.9	42,211.9
Silver (10,379,305.39 ounces)	7,474.2	7,474.2	7,474.2
Total Precious Metals	49,686.1	49,686.1	49,686.1
2. Foreign Exchange Assets			
U. S. Dollars	4,124.6	4,759.8	3,698.2
Sterling	235.2	276.0	109.2
Other	3,985.3	4,456.9	1,105.2
Total Foreign Exchange	8,345.1	9,492.7	4,912.6
3. Foreign Exchange Liabilities			
U. S. Dollars	4,031.4	3,378.0	3,180.5
Sterling	505.6	524.2	267.6
Other	4,325.8	4,014.6	1,173.2
Total Foreign Exchange Liability	8,862.8	7,916.8	4,621.3
4. Net Foreign Exchange Assets			
U. S. Dollars	+93.2	+1,381.8	+517.7
Sterling	−270.4	−248.2	−158.4
Other	−340.5	+442.3	−68.0
Total Net Foreign Exchange Position	−517.7	+1,575.9	+291.3

(Source: Da Afghanistan Bank.)

course, be provided by recalculating the value of reserve in terms of the 21 afghani official rate. On this basis, it would translate into 1,050 million afghanis and provide cover for a note issue of 3.5 billion. These calculations assume that any trade deficit resulting from the development program would be met largely by borrowing abroad without any serious reduction in the gold and silver holdings.

In the absence of any substantial foreign exchange balances, the precious metal reserves will also be needed to cover the conduct of Afghanistan's foreign trade. Seasonal fluctuations in exports, the necessity for making advance payments on imports of capital goods, and other kinds of lags between import payments and export receipts, will have to be taken into account. These may well involve a significant reduction in the volume of reserves available at any particular time as currency backing.

In this connection, the government's plan to take over all foreign exchange receipts of the country with the ultimate objective of abandoning the multiple exchange rate system may also be a significant factor. It seems very doubtful that it will, in fact, be possible to take over all foreign exchange earnings but, to the extent that this is done, foreign exchange will have to be made available to importers much more liberally. This may well result in increasing the fluctuations of the net foreign exchange position. Moreover, during the period in which this new policy is being put into effect, it may be expected that foreign exchange sales to importers will expand faster than foreign exchange receipts from exporters. All these factors may well be reflected in a substantial reduction in the amount of currency cover available at any particular time.

As pointed out in the discussion of internal financing earlier in this chapter, however, it should be reemphasized that the problems and dangers involved in a further rapid expansion of currency in circulation go far beyond conformity with legal reserve requirements and center on the crucial issue of avoiding a degree of inflation that would result in serious economic disruption.

Foreign Debt

Afghanistan's total external government debt approximates $40.9 million at this time. This consists of $28.4 million received to date on the Eximbank loans at 3-½ and 4-½ percent, two Soviet loans of $2.5 million and $3.5 million respectively, a Czechoslovak loan of about $5 million and a U. S. food loan of $1.5 million. On the basis of present plans, this debt would increase sharply over the period of the long-range development plan as shown in Table No. 21.

This program, if carried through, would raise total government loans to $157 million or about $116 million higher than at present. In addition, it is hoped that some $44 million can be raised as foreign loans for private industry and municipalities. The total increase of $160 million may be compared with the figure of $181 million of foreign exchange needed to implement the Five-Year Plan described earlier in this chapter. It is evident, therefore, that this large expansion in debt would not cover the requirements fully. Even before allowing for debt-

Table No. 21

POSSIBLE FUTURE EXTERNAL DEBT

(In Millions of Dollars)

Source	*Amount*	*Terms*	*Date of First Payment*
Eximbank (1950)	21.0	3½% in 18 equal annual instalments. Authorized Nov. 23, 1949	October 1958
Eximbank (1954)	18.5	4½%, 18 equal annual instalments (staggered). Authorized Apr. 29, 1954	October 1958
U. S. Food Loan (1953)	1.5	2½%, repayable in local currency in 30 annual instalments with a 3-year grace period. Interest accrues from Jan. 15, 1954	Interest Jan. 15, 1957 Principal Jan. 1959
International Airport Loan (ICA)	5	3% repayable at GOA request in dollars over a 37-year period—part in conjunction with a grant of additional 9.5 million	4 years after end of month in which first disbursement is made
USSR	6	2% in 8 equal annual instalments after a 5-year grace period	Not available
USSR	100	2% over 30-year period including 8-year grace period on payments of principal	Not available
Czechoslovakia	5	2% in 5 equal annual instalments—beginning 3 years after goods cross border	1959 on the 1.3 million involved in cement plant
Total	157.0		

servicing needs, a sizable gap would remain to be filled by hoped for expansion in export revenue. While it would be possible theoretically to reduce imports of non-developmental goods, this would be extremely difficult in the face of internal inflationary pressures. It is more likely, in fact, that such imports would have to be increased to provide additional consumption goods to absorb some of the expansion of purchasing power generated by the program.

Some increase in exports will, of course, be realized as a direct result of industrial and agricultural expansion. For example, the Gulbahar cotton textile plant is expected to be in production in 1957. At full capacity, it should produce some 35 million square meters of cotton textiles which would effect a gross foreign exchange saving of approximately $4 million. The net saving, taking into account the use of raw cotton by the mill that could otherwise be exported, might be about half that amount. It is also expected that Afghanistan's first cement plant with a productive capacity of 100 tons per day will be in operation next year. In full produc-

tion, this may save close to $1 million in foreign exchange annually. As noted earlier, higher agricultural output in the Helmand Valley resulting from the development program should permit larger exports of fruit, wool and probably hides. Other projects, herein recommended, would earn or save additional sums.

Taking all these savings into account, however, it still seems clear that it will not be an easy task for Afghanistan to service the loans it is contemplating. Difficult foreign exchange problems are almost certain to be encountered, though these may well occasion less serious concern than the problems of internal financing referred to earlier.

PROBLEMS OF GENERAL NATURE

The development of the Helmand Valley involves both internal and external problems of a general nature which have a direct effect upon various aspects of policy.

In the first place, interregional rivalries must be taken into account. As shown earlier in this chapter, the bulk of governmental development expenditures has been in the Helmand Valley, and many other areas have not had the benefit, or until recently the anticipation of benefit, from such direct expenditures. The proposed Five-Year Plan is expected to remedy this to a degree. One reason for the eagerness of the government to realize direct returns from the Valley is to help in financing the Five-Year Plan generally.

Interregional rivalry affects not only the relative role assigned to the Valley in the national program but also some of the government's policies within the Valley itself. Most notable, perhaps, is the problem of land settlement, where the limited land allocations per family are influenced in part by the desire not to exceed average holdings elsewhere in Afghanistan.

Externally, there are problems involved in connection with the discussions with the Government of Iran on the control and utilization of the waters of the Helmand River. The Government of Afghanistan wishes to make the fullest and earliest possible use of irrigation waters in the Valley consistent with the context of these discussions, and this desire has been reflected both in the schedule of development and in the pattern of water releases from the storage reservoirs. In the judgment of the Survey Team, the development now contemplated would not place any serious burden in terms of water restrictions upon the flow available to either Afghanistan or Iran.

The existence of an Iranian diversion dam across the Rud-i-Seistan, which constitutes the principal outlet of the Helmand River into the Seistan Basin, has been of concern to the Government of Afghanistan, particularly during recent flood years. There is a strong belief on the part of Afghan officials that this dam, located about a mile inside the Iran border, has tended to raise the water levels in other channels of the river and has caused more than a normal diversion of flood waters into the Chakhansur Basin on the Afghan side of the international boundary. The situation has been aggravated by the fact that a secondary outlet channel

into the Seistan Basin, known as the Rud-i-Paruin, was blocked some time within recent years by sand dunes.

The little information available regarding the Iranian diversion dam seems to indicate that it restricts the natural channel only to a minor degree and that the gate openings through it are adequate to pass the flow of the Rud-i-Seistan without much backwater effect. The control of the structure is, of course, entirely in the hands of Iranian officials, and it is possible that the gates may have been closed or partly closed during times when the Helmand River was at stages approaching flood level. Under such circumstances, above-normal flows would be diverted onto lands within the Afghan borders. It is believed that the whole matter of control of the water and development of additional irrigated lands in the basin must sooner or later be the subject of comprehensive planning undertaken jointly by the two countries.

Another major problem which greatly affects the Valley's development is that of relations with Pakistan. The future prosperity of the Valley will depend in very considerable part upon the smooth and rapid transit of goods through Pakistan, and it is essential that such transit be made as easy as possible. Existing difficulties and delays, particularly in shipping goods to and from Karachi, constitute a serious burden upon trade, increase the cost of development, and may well retard the Valley's economic growth. Realization of the full benefits of the development program will depend in good part upon the conclusion of arrangements with respect to the transit of goods which will remedy these burdens and delays.

Chapter X
PROPOSED REVISION OF DEVELOPMENT PROGRAM

DEVELOPMENT BY PHASES

A review of the facts and figures presented in the foregoing chapters of this report leads to the inescapable conclusion that a major revision of the present construction program in the Helmand Valley should now be made if the best interests of the Government of Afghanistan are to be served. This conclusion is based on the belief that the extensions of the irrigation and drainage systems into new areas, if carried out in full as now planned, will be completed (1) long before the land can be leveled and prepared for the use of farmers, (2) before land surveys and ownership records can be completed which will permit the government to secure for settlement purposes the lands in these new areas to which it should be entitled, and (3) before the Helmand Valley Authority can perfect its organization and staff to the point where it can successfully administer the settlement of the new land, the regulation and control of the use of the irrigation facilities, and generally derive the benefits from the very large additional area which would come under its control.

In addition to the above considerations, the full development of the Tarnak area would be completed before it has been satisfactorily established that there will be a reasonably adequate supply of irrigation water for this area. Furthermore, in the Nad-i-Ali and Marja areas, where special drainage problems have been encountered, it would appear that the extensive system of additional drains still proposed would be constructed before it has been established that this additional work would actually be effective in making the land productive for ordinary crops.

This leads to the recommendation that the construction and land development work remaining to be done subsequent to June 25, 1956, should be divided into two phases: Phase I incorporating those projects and parts of projects which should be carried to completion under the present MKA contract or an extension thereof; and Phase II those which should be deferred to a later date.

This revision of the program will result in bringing the best lands into production first. It will permit the land preparation work to be completed within a minimum time after water is made available through the irrigation canals, thus assuring earnings on the investment at the earliest possible date. Finally, it will give the HVA an opportunity to perfect its organization and complete its land surveys so that the settlement of new lands can be administered rapidly and effectively.

RECOMMENDED PHASE I PROGRAM

Phase I Construction Program

The construction and survey projects recommended for inclusion in Phase I

are listed below. The list includes only irrigation and drainage work and incidental surveys and road work, except that the Girishk power development is included because it is provided for in the current MKA contract.

Arghandab and Tarnak Areas

1. Complete Arghandab diversion dam, South Canal, and Tarnak Canal to the Tarnak River as planned, with wasteway from the South Canal to deliver water to existing canals serving the Central Arghandab area.

2. Provide temporary and partial water service to upper portion of Tarnak area by (1) constructing a lateral to a point southeasterly of the Kandahar International Airport, (2) constructing a lateral to the village of Khush-Ab, and (3) cleaning out the lower 10 kilometers of the Nakwadak and Rhorabad Canals and constructing siphon extensions across the Tarnak River into the Tarnak area.

3. Undertake and complete the proposed irrigation, engineering, and drainage survey of the Central and North Arghandab areas for the purpose of devising means to improve the efficiency of the use of irrigation water in those areas through allocation, measurement, control, conveyance, and management of available water supplies.

4. Construct intake structures at Arghandab River inlets to five existing irrigation canals in North Arghandab area as planned.

Nad-i-Ali Area

Complete only 18 kilometers of outlet drains and farm drainage on about five test areas approximately 1,500 acres as planned under current contract.

Marja Area

Complete main irrigation system and outlet drains at one kilometer spacing; install farm drains only in a selected 1,200-acre tract as planned under current contract.

Shamalan Area

Complete trunk outlet drains with laterals and accumulator drains.

Darweshan Area

1. Complete construction of contractor's camp.

2. Construct diversion structure and main irrigation canal to a point three kilometers below Lakhi village, thereby serving the upper two-thirds of the area.

3. Construct Hazar Juft intake and canal.

4. Provide main drains for upper two-thirds of the area, with an outlet southerly into an existing salt sink or through the sand dune area to the Helmand River.

Girishk Power Development

Complete installation of power generating equipment and transmission lines as provided in current MKA contract.

General Plan

The present development project, which was started in 1946, includes two large storage reservoirs, one on the Helmand River and the other on its chief tributary, the Arghandab River. Diversion dams are provided on each of these streams and large irrigation canals carry water to project lands, some of which have been irrigated in the past through small locally built canals and others of which have not been irrigated in recent times. The program also includes preparation of the land for farming and an extensive drainage system.

OBJECTIVES OF THE HELMAND VALLEY PROGRAM

The International Cooperation Administration has been providing technical services to the Afghan Government in connection with the program during the past four years and has defined the objectives of the development in two stages as follows:

Stage One

a. to bring adequate irrigation to potential agricultural lands;

b. to provide suitable communities for permanent stabilization and resettlement of nomad people on agricultural lands;

c. to save foreign exchange by providing agricultural products now imported.

Stage Two

a. to provide power for the over-all economic development of the area;

b. to encourage development of marketing and processing facilities and small industry;

c. to improve transportation and communications;

d. to increase foreign exchange earnings through sale of surplus products.

The objectives of the Afghan Government in undertaking the development of the Helmand Valley appear to have been somewhat broader in scope. The following purposes were expressed by various Afghan officials during the period of the present survey: provide new farms for nomads and landless villagers; raise the standard of living of people in the Valley; produce agricultural and manufactured products for export; develop electric power; create government income which will eventually pay off the investment; provide protection against floods; and provide for early utilization of all waters of the Helmand River except that portion to which Iran is entitled.

HISTORY OF THE PROJECT

There is evidence that many parts of the Valley were extensively cultivated 2,000 years ago or more and that successive hordes of invaders from the north and west destroyed large cities and major irrigation canals, rendering much of the area desolate. An exception is the area around Kandahar which has been cultivated on a large scale for a great many years. The first modern works for irrigation of Valley lands were started by the Afghan Government in the late 1930s.

Road Construction

1. Complete repairs of Helmand River bridge at Lashkar Gah.
2. Complete design of the new Helmand River bridge at Lashkar Gah.

Engineering Surveys

Complete authorized Helmand Valley surveys.

Contingencies

Perform such additional surveys and do such additional construction work as may prove to be necessary to bring program to satisfactory completion. This item is included in view of the fact that many of the estimates of cost for contemplated surveys and construction are based on preliminary information and may prove to be too low.

The cost of completing the proposed Phase I work under the current MKA contract, including the Girishk power development, is shown in Table No. 22.

Table No. 22

COST OF PHASE I CONSTRUCTION WORK

(All currencies; including Contractor's fee)

Item	*Estimated Cost*
Arghandab Diversion Dam	$ 786,514
Arghandab South Canal	1,480,387
Tarnak Canal	2,690,065
Tarnak Service Laterals	216,000
Arghandab Irrigation Survey	194,704
North Arghandab Intakes	171,774
Nad-i-Ali Drainage and Survey	308,126
Marja Irrigation and Drainage	1,255,365
Shamalan Drainage	442,375
Darweshan Irrigation and Drainage	4,264,418
Repair of Bridge at Lashkar Gah	19,438
Plans for New Bridge at Lashkar Gah	11,572
Helmand Valley Surveys	51,269
Girishk Power Development	1,442,746
Contingencies	500,000
Total after June 26, 1956 (all currencies)	$13,834,753

If the Girishk power development is excluded, the remaining cost would be $12,-392,007, all of which would be properly chargeable to the irrigation and drainage development. If the Lashkar Gah bridge items, Helmand Valley surveys, and the contingency provision are also deducted, the remainder directly chargeable to project areas would be $11,809,728.

The funds, required to complete the work in the proposed Phase I construction program, are estimated as shown below.

Funds Required

Phase I Construction after June 26, 1956	$13,834,753
Amount Spent on Contract to June 26, 1956	7,563,758
Total Cost to Completion of Phase I	$21,398,511
Amount Required in Dollars (75% of above)	16,048,883
Less Dollars allocated from Bank Loan	15,150,000
Shortage in Dollars	$898,883
Or Approximately	$900,000

Phase I Land Development Program and Costs

Immediately following completion cf construction work in each project area, it will be necessary for the ACU to proceed with the land development work necessary to put the new land in readiness for actual farming operations. The work required will include leveling and grading, irrigation laterals and sublaterals, and accumulator drains in the Marja and Shamalan areas and the upper two-thirds of the Darweshan area. It is assumed that any additional farm drains, which may prove to be necessary, will be constructed by the farmers with possible assistance from the HVA. Excluding this work, which should in any event require little or no foreign exchange, the land development cost at present prices is estimated as follows:

Land Development Cost

Marja Area	$1,984,300
Shamalan Area	2,646,400
Darweshan Area (Upper two-thirds)	2,238,315
Total Cost—all currencies	$6,869,015

The funds required to complete the land development work in the proposed Phase I program are estimated as follows:

Funds Required

Phase I Development after June 30, 1956	$3,847,800
Amount spent prior to June 30, 1956	3,021,215
Total Cost to completion of Phase I (as above)	$6,869,015
Amount required in Dollars (75% of above)	5,151,761
Less Dollars allocated from Bank Loan	3,300,000
Shortage in Dollars	$1,851,761
or approximately	$1,900,000

Other Projects in Phase I Program

Six public projects, not included under the categories of construction or land

development, are recommended in preceding chapters of this report and should be undertaken as parts of the Phase I program. They are listed in Table No. 23 with estimates of costs expressed in all currencies and the portion thereof required to be furnished in dollars.

These figures do not include any of the recommended private investments in agriculture or industry described in Chapter VIII.

Table No. 23

OTHER PROJECTS IN PHASE I PROGRAM

Project	*Funds Required* *All Currencies*	*Dollars*
Fertilizer Purchase Program, to be spread over a period of 5 years (See Chapter III)	$500,000	$475,000
Conversion of Nad-i-Ali area to permanent pasture and hay (See Chapter III)	1,500,000	475,000
Arghandab Power Development including transmission line (See Chapter VIII)	2,400,000	2,100,000
Electric Distribution System and Diesel Units in Kandahar (See Chapter VIII)	500,000	425,000
Cadastral Survey to establish land ownerships and boundaries to be done in 4 years (See Chapter VII)	900,000	400,000
Fruit Research Center at Kandahar (See Chapter VIII) Expenditure first 2 years	200,000	125,000
Total Funds Required	$6,000,000	$4,000,000

Total Costs all Projects in Phase I (After June 26, 1956)

Item	*All Currencies*	*Additional Dollars Required*
Construction	$13,834,753	$900,000
Land Development	3,847,800	1,900,000
Sub-Total	17,682,553	2,800,000
Other Projects	6,000,000	4,000,000
Total	$23,682,553	$6,800,000

RECOMMENDED PHASE II PROGRAM

The construction and land development work which would be assigned to Phase II, to be undertaken after completion of Phase I and after all of the lands thereby provided with water have been brought to the stage of develop-

Table No. 24
COST OF PHASE II — CONSTRUCTION AND LAND DEVELOPMENT

Item	*Estimated Cost (All Currencies)*
Darweshan Area	
Complete irrigation and drainage systems in the lower third of the area, which was omitted from Phase I	$2,500,000
Land Development Work	1,100,000
Sub-total	3,600,000
Seraj Area	
Improve intake, enlarge and improve the existing canal system, and provide drainage outlets	3,000,000
Land Development Work	3,700,000
Sub-total	6,700,000
Tarnak Area	
Construction of irrigation and drainage systems, if and as adequate water supply is assured	3,100,000
Land Development	3,900,000
Sub-total	7,000,000
Road Construction	
Improve road from Yakhchal to Kajakai Dam	350,000
Complete improvements of Kandahar-Girishk Road	180,000
Construct new two-lane bridge across Helmand River at Lashkar Gah to replace Temporary bridge	170,000
Sub-total	700,000
Total Cost Phase II Construction and Land Development	$18,000,000
Total Amount Required in dollars (75%)	$13,500,000

ment where they are ready for the introduction of new settlers, is shown in Table No. 24 with approximate costs based on present prices.

As shown in Table No. 24, the financing of the recommended Phase II construction and land development work will require about $18 million in all currencies and about $13.5 million in dollars. These figures should, of course, be used with some caution for the reason that the Phase II work probably will not be started for several years. In the meantime, the costs of construction work, especially those for labor and equipment, may show substantial increases. On the other hand, it is assumed that continued surveys and planning will have been carried on and that consequently there will be a better determination of the exact land areas to be served and the most economical location of canals, drainage

ditches, and structures. Savings by better advance planning should more than compensate for possible increases in wages and prices.

It should be noted that the Tarnak irrigation and drainage system has been included in Phase II but only with the reservation that this construction should not actually be undertaken until it has been definitely determined to the satisfaction of all concerned that there will be sufficient water supply for this area, after taking into account the prior and over-riding demands of the North and Central Arghandab areas.

FUTURE ENGINEERING AND CONSTRUCTION

It is assumed that MKA under its current or an extended contract will complete all of the work described above under Phase I construction and surveys. It would also be advisable to have the same contractor build the Arghandab power development, using plans already prepared, and perhaps undertake also the installation of the diesel units and reconstruction of the electrical distribution system in Kandahar.

After completion of the Phase I construction program, surveys should be continued in the Valley, including preliminary surveys for future extensions of the irrigation and drainage systems and for additional water supplies for the Tarnak area, including studies of reservoir sites and underground water resources. At the appropriate time, detailed plans should be prepared for the construction work to be undertaken in the Phase II program. It would be advisable to employ an engineering firm to undertake the required advance planning and design work and also to act later for the Government of Afghanistan in the engineering supervision of future construction work when it is undertaken. Following usual American practice, *it is considered desirable to engage for these purposes an engineering concern which does not itself normally do construction contracting.*

The construction units included in the proposed Phase II program could be undertaken successively under separate contracts or all at the same time under a single comprehensive contract. With complete and detailed construction plans and specifications on hand, it should be possible to call for construction bids on a unit-price basis, that is, by means of separate bid prices for each of the categories of construction work, such as excavation, grading, hauling, concrete work, culvert pipes, and various types of gate and control mechanisms. In the event that satisfactory competition on the basis of bid prices cannot be obtained, it may be advisable to negotiate a contract or contracts on the basis of actual costs plus a fixed fee or a sliding scale of incentive fees.

In either case, the contract would specify the camp facilities and construction equipment which would be available to the contractor for use on the new work. For this reason, it would be advisable to keep intact such of the construction camps and equipment as may not in the meantime be devoted to other purposes.

Chapter XI

COSTS AND BENEFITS OF THE PROGRAM

The purpose of this chapter is to bring together in brief form a review of the investment which has been made and is being made by Afghanistan in the development of the Helmand Valley and an estimate of the benefits which have been derived and will be derived in the future.

Afghanistan's problems have been intensified by the lack of a clear-cut view as to the total cost of the presently contemplated development of the Valley and the probable length of time required to complete it. This lack of a long-range view has resulted in a piece-meal approach to the program with all the fiscal difficulties attendant thereto. As a result of the present intensive over-all survey of the Valley and the excellent cooperation of governmental authorities in furnishing pertinent statistics, it is now possible for Afghanistan to take at least a brief glimpse into the future in terms of both money invested and benefits realized.

PRESENT INVESTMENT IN HELMAND VALLEY

Problems Affecting Estimates of Total Investment

It is essential to recall that Afghanistan has a system of multiple exchange rates, ranging from a low of 16.8 afghanis to the dollar to a high of about 56 to the dollar, the present free-market rate. Different exports and imports are subject to the application of different rates, depending on the commodity in some cases or the use of the commodity in other cases. This system creates a difficult problem when it becomes necessary to estimate total costs or benefits received in terms of a single currency.

When the costs and the estimated benefits from an investment are converted into a single currency, such as dollars, at one of the relatively low rates, there is a tendency to exaggerate the benefits in comparison with the costs. This is particularly evident where a significant part of the costs is actually expended in dollars. On the other hand, use of a high rate tends to exaggerate the costs in comparison with the benefits.

The theoretically ideal solution would involve the use of a series of different conversion factors to be applied to costs and to benefits, which would reflect purchasing power parity as closely as possible, but the complications involved would make such a procedure entirely impractical. Nor would it be feasible to derive any single exchange rate which would be truly representative and which could apply equally to costs and to benefits.

Since it is necessary to calculate the costs of the project and the benefits derived from it in terms of a single currency, United States dollars are clearly the most useful common denominator for this purpose. It is also desirable that these calculations be readily comparable to those made by the Government of Afghan-

istan and its engineers over the past decade. For this reason, and also because of the difficulty of recalculating every cost estimate made during past years, the estimates contained herein follow as closely as possible the conversion ratios used by the government which were, in general, the official rates prevailing at the time of the expenditures. It should be borne in mind, however, that this means that costs in terms of dollars are minimized in relation to computed dollar benefits except to the degree that dollars are actually earned at those rates or can be acquired at such rates for servicing a dollar loan.

Investment from All Sources in the Valley

The Government of Afghanistan has supplied the figures in Table No. 25 showing its total development expenditures in the Helmand Valley. As indicated, it expended some 367 million afghanis, in all currencies, in the Valley prior to the first Eximbank loan in the year 1950-51 including, in foreign exchange, some $17 million and about 13 million rupees. The total expenditures since 1950 have amounted to about 1.2 billion afghanis, in all currencies, including about $30 million and about 18 million rupees in foreign exchange.

Table No. 25

AFGHANISTAN GOVERNMENT DEVELOPMENT EXPENDITURES IN THE HELMAND VALLEY

Year	*Foreign Exchange* *U. S. Dollars*	*Rupees*	*Total All Currencies In Afghanis*
1946–47 to 1948–1949	16,777,959	12,968,633	272,822,182.00
1949–1950			94,619,867.93
1950–1951	6,324,000	319,369	192,757,828.12
1951–1952	7,800,000	3,476,200	262,147,986.98
1952–1953	4,563,712	4,039,171	192,646,034.05
1953–1954	3,409,475	961,465	162,200,765.00
1954–1955	3,681,000	3,567,590	201,107,958.11
1955–1956	4,327,506	5,446,590	187,920,000.00
Totals	46,883,652	30,779,018	1,566,222,622.19
	4,266,357	(Eximbank loan for which debit note not received.)	
Total	51,150,009		

For the reasons explained above, the dollar equivalent of these afghani expenditures has been calculated on the basis of the rate of 17.0128 afghanis to the dollar prior to 1954-55 and at the present official rate of 21.266098 thereafter. On this basis, and after making several minor adjustments, it would appear that the

total development cost in the Helmand Valley to June 30, 1956, has been about $83 million in all currencies.

The major part of the $83 million was expended through MKA. The breakdown of MKA costs to June 1956 is shown in Table No. 4 in Chapter IV, which shows that $53.7 million may be considered as an investment in development of the Valley, including $46.2 million for irrigation, drainage and power, $6.7 million for highways, and $0.8 million for other related work.

Another part of the total expenditure was made through ACU, which is an integral part of the HVA and Government of Afghanistan. Its expenditures on land and irrigation development are considered separately because it plays a separate role in preparing the land for the farmer after MKA's work has been completed. According to ACU records, it has expended some $3.0 million in all currencies through June 1956, including about $2.3 million of the $3.3 million allocated to it from the Eximbank loan. Most of these dollar expenditures since the inception of ACU in 1954 have been in the form of payments or commitments to pay for machinery on order but not yet received. (See Chapter VI.)

The remainder of the government's expenditures in the Valley, after deducting MKA and ACU costs, amounts to about $26.5 million. No information was obtainable as to the specific purposes for which this sum was expended, except that $4,961,000 was used for highways and various surveys. The balance of about $21.5 million undoubtedly covered the purchase of land for reservoirs and canals, construction of the town of Lashkar Gah and several new villages, erection of public buildings, and costs of settling new farmers on developed land. It may also have covered costs of operation and maintenance of the irrigation and drainage works, maintenance of the road system and other improvements, and the administrative expenses of the HVA and the government agencies which preceded it in the Valley.

Table No. 26

TOTAL EXPENDITURES IN THE HELMAND VALLEY TO JUNE 30, 1956

(All currencies, in thousands of dollars)

	Expenditure by			
Purpose of Expenditure	*MKA*	*ACU*	*Other Govt.*	*Totals*
Upper Helmand Valley				
Irrigation and Land Development	38,149	3,021	21,510	62,680
Lower Helmand Valley	2,017			2,017
Helmand Valley Power	6,027			6,027
Totals—Irrigation, Land Development and Power,	46,193	3,021	21,510	70,724
Highways, Surveys and Other Costs	7,499		4,961	12,460
Total Helmand Valley Development Costs	53,692 [1]	3,021	26,471	83,184

[1] This excludes $1,386,777 representing MKA costs outside the project area. Total MKA costs were $55,078,650.

The distribution of the total expenditure by major purpose and expending agency is shown in Table No. 26. Allocation of MKA costs conforms with Table No. 4 in Chapter IV. It will be noted that nearly $71 million has been invested in irrigation, land development and power and that, of this amount, about $62.7 million was invested in irrigation and land development in the Upper Helmand.

ADDITIONAL COSTS REQUIRED FOR COMPLETION

Land Development and Irrigation by Phases

PHASE I. As shown in Chapter X, the additional MKA irrigation and land development costs proposed for the Phase I program would amount to $12,392,-007 in all currencies. Deducting the amounts for the old and new Lashkar Gah bridge, the Helmand Valley surveys, and the $500,000 contingency provision, which are not readily allocable to specific area projects, would leave $11,809,728. In addition, ACU will have to spend $3,847,800 in the Marja, Shamalan, and Upper Darweshan areas to prepare them for farming. This excludes the farm drains which should be built by the farmers, perhaps with some help from HVA. Such assistance may involve certain work on the part of ACU such as making drainage tile or operating a trenching machine. There is no way of estimating the cost of such assistance but it should be moderate and the dollar requirement should be low.

Another item of land development is the conversion of certain low-class lands to permanent pasture and hay as described in Chapter III, where the cost is estimated to be $1.5 million.

The sum of the above three items is about $17,158,000 which, added to the $62,-680,000 previously spent on irrigation and land development, would make the total expenditure for this purpose just under $80 million through the completion of Phase I.

ALLOCATION OF COSTS THROUGH PHASE I. Allocations of cost to the various project areas made heretofore by MKA have assigned substantial amounts to projected development areas which will not be undertaken until some time in the distant future. In seeking a logical and realistic estimate of unit costs, allocations in the present report have been held rigorously to the areas likely to be developed in the reasonably near future as described in the discussion preceding Table No. 4 in Chapter IV. This means, of course, that costs for these areas will be somewhat higher than those calculated by MKA, but it would seem that an analysis based upon this conservative approach is more meaningful at this time. The amount distributed excludes project costs allocated to power, such as the 25 percent of storage dam costs, but includes the expenditures made by the Afghan Government over and above payments made through MKA or ACU.

Allocations of costs to project areas through Phase I are shown in Part A of Table No. 27, and the investment per acre in each area is shown in Part A of Table No. 28. These tables also show allocations to June 26, 1956 and the additional costs under Phase I.

Table No. 27

TOTAL INVESTMENT IN IRRIGATION AND LAND DEVELOPMENT[1] PHASE I AND PHASE II

All Currencies

Part A—Investment Through Phase I

Project Area	*Investment—Thousands of Dollars*		
	To June 26, 1956	*Additional For Phase I*[2]	*Total Through Phase I*
North Arghandab	3,712	172	3,884
Central Arghandab	7,882	1,328[3]	9,210
Tarnak	6,642	4,040	10,682
Kajakai-Shamalan	5,173		5,173
Seraj	6,208		6,208
Nad-i-Ali	6,636	1,808[4]	8,444
Marja	9,126	2,445	11,571
Shamalan	12,052	1,852	13,904
Upper Darweshan	3,499	5,513	9,012
Lower Darweshan	1,750		1,750
Total	62,680	17,158	79,838

Part B—Investment Through Phase II

Project Area	*Investment—Thousands of Dollars*		
	Through Phase I	*Additional For Phase II*[2]	*Total through Phase II*
North Arghandab	3,884		3,884
Central Arghandab	9,210		9,210
Tarnak[5]	10,682[3]	7,000	17,682
Kajakai-Shamalan	5,173		5,173
Seraj	6,208	6,700	12,908
Nad-i-Ali	8,444[4]		8,444
Marja	11,571		11,571
Shamalan	13,904		13,904
Upper Darweshan	9,012		9,012
Lower Darweshan	1,750	3,600	5,350
Total	79,838	17,300	97,138

NOTES:

1 Excluding investment in roads and general surveys.
2 Excludes cost of farm drains.
3 Includes cost of Arghandab irrigation survey.
4 Includes $1,500,000 for conversion to pasture and hay.
5 Assumes adequate water supply developed.

Following a delay caused by World War II, the Government of Afghanistan reactivated the project and in 1946 employed Morrison-Knudsen Afghanistan, Inc. (MKA), (a subsidiary of the Morrison-Knudsen Company, Inc.) to undertake surveys and plans and commence construction. This contract included the reconstruction of the road from Kandahar to the Pakistan border and the reconstruction and extension of a major diversion canal from the Helmand River, known as the Boghra Canal, which had been started under the supervision of Japanese engineers in about 1937. The work was financed entirely by the Government of Afghanistan.

Two additional contracts were subsequently awarded to the same contractor, one in 1950 and the other in 1954. Under these contracts, the two storage reservoirs were constructed and the Boghra Canal, with certain laterals, was completed. Other land development work and irrigation and drainage canals were undertaken. The 1950 and 1954 contracts were financed in part by loans from the U. S. Export-Import Bank in amounts of $21 million and $18.5 million respectively. Upon completion of the three contracts, including the work contemplated to be completed under the third contract, the total expenditure will be about $77 million. In addition to the cost of MKA contract work, the Afghan Government has spent about $24 million in the Helmand Valley.

LANDS TO BE BENEFITED

Most of the land to be benefited by the irrigation system is located on valley fills on one or both sides of the Helmand or Arghandab Rivers, but two isolated areas on old river terraces or bench lands lying west of the Helmand River are also included in the project. Except for the latter, nearly all areas have been irrigated to some degree in the past by diversion of unregulated river flow into private or community ditch systems.

The building of the storage reservoirs on the Helmand and Arghandab Rivers has provided an augmented and regulated water supply for lands previously irrigated. In addition, the completion of contemplated construction work will provide facilities in varying degree for the irrigation and drainage of other lands ranging from complete reclamation in some areas to the mere provision of new inlet control structures for existing community ditch systems in other areas. All areas below the reservoirs will benefit by the regulation of the river runoff afforded at the storage reservoirs.

The locations of the various development areas to be benefited by the construction program are shown on Plate II. Table No. 1 lists the areas by name, gives the potentially net irrigable area of each, as most recently estimated by MKA engineers, and indicates the type of service which will be rendered when the contemplated construction program is completed. The table also shows the best available estimates of acreages formerly irrigated and presently irrigated annually in each area.

Table No. 28

PER ACRE INVESTMENT IN IRRIGATION AND LAND DEVELOPMENT[1]

PHASE I AND PHASE II

All Currencies

Part A—Investment Through Phase I

Project Area	*Net Irrigable Acres*	*Investment Per Acre in Dollars*		
		To June 26, 1956	*Additional For Phase I*	*Total through Phase I*
North Arghandab	40,235	92	4	96
Central Arghandab	80,475	98	16	114
Tarnak	63,350	105	64	169
Kajakai-Shamalan	45,500	114		114
Seraj	63,000	99		99
Nad-i-Ali	18,500	359	98	457
Marja	27,190	336	90	426
Shamalan	42,325	285	44	329
Upper Darweshan	33,849	103	163	266
Lower Darweshan	16,924	103		103
Total & Averages	431,348	167 [2]	45 [2]	212 [2]

Part B—Investment Through Phase II

Project Area	*Net Irrigable Acres*	*Investment Per Acre in Dollars*		
		Through Phase I	*Additional For Phase II*	*Total through Phase II*
North Arghandab	40,235	96		96
Central Arghandab	80,475	114		114
Tarnak	63,350	169	110	279
Kajakai-Shamalan	45,500	114		114
Seraj	63,000	99	106	205
Nad-i-Ali	18,500	457		457
Marja	27,190	426		426
Shamalan	42,325	329		329
Upper Darweshan	33,849	266		266
Lower Darweshan	16,924	103	213	316
Total & Averages	431,348	185	121 [3]	225

NOTES:

[1] See footnotes on Table No. 27.
[2] Average excluding Tarnak, Seraj, and Lower Darweshan.
[3] Average added cost per acre for Tarnak, Seraj, and Lower Darweshan only.

PHASE II. The added irrigation and land development expenditure proposed for Phase II as estimated in Chapter X will be $17.3 million, excluding highway work and assuming that the Tarnak development is undertaken. Total costs through the completion of both phases would thus become $97 million. These expenditures by areas are shown in Part B of Table No. 27 and the investment per acre in Part B of Table No. 28.

It is evident from Table No. 28 that, except in the Tarnak, Seraj, and Darweshan areas, where little actual work has been done, the added costs involved in bringing the project to completion are considerably less in each case than the amounts previously invested. The average additional investment per acre required under Phase I will amount to about $45 as compared with $167 per acre already invested in the areas involved. The largest additional investment per acre under Phase I would be for the Upper Darweshan, where construction work is just starting, but it should be noted that after the completion of Phase I the total per acre investment in the Upper Darweshan will be much less than in Nad-i-Ali and Marja and somewhat less than in the Shamalan.

Operations under Phase II will be considerably more expensive in terms of costs per acre. This seems an added reason for the deferment of this phase for the time being. The total investment in irrigation and land development in all areas except the Tarnak, Seraj, and Lower Darweshan, after completion of Phase I, will be $212 per acre; after completion of Phase II, the average for all areas will be $225.

Settlement Costs

In addition to the costs of preparing the land for cultivation, account must be taken of the expenses incurred in settling farmers on the land. HVA has expended approximately 21.2 million afghanis to settle 1,330 families on Nad-i-Ali, an average of about 16,000 afghanis per family. This sum is repayable over 25 years without interest. As the result of the recent change in policy as to amount of assistance granted to new settlers on land in the Upper Helmand Valley, settlement costs are now anticipated at approximately 5,000 to 6,000 afghanis per family. This sharp reduction from the Nad-i-Ali average of 16,000 afghanis per family appears to be dictated primarily by the exigencies of the Afghan national budget. As indicated in Chapter VII, these sums for settlement of the new areas in the Upper Helmand Valley go to help finance housing, seed, food, oxen, and other necessities while the land is being brought into cultivation.

In order to determine the approximate number of farms to be established in the future, an estimate was made for each area benefited under the Phase I and Phase II programs, with the results shown in Table No. 29. The computations entering into this table were based on the assumptions: (a) that lands being cultivated prior to inception of the project, whether on an annual or intermittent basis, were privately-owned; (b) that remaining land in each area was government-owned and, therefore, open to settlement when needed; and (c) that the known

land classifications for each area as a whole would be applicable in the same ratios to both the privately-owned and government-owned land. In certain of the areas, the area of government-owned land was reduced somewhat to allow for poorer lands which probably will not be reclaimed for many years following completion of the Phase II work. The balance of the area of government-owned land, having been segregated by land classes, each figure was divided by the number of acres proposed to be allocated per family within each land class according to present government policy (Class I-7.5, Class II-10.0, Class III-12.5, and Class IV-15.0). The resulting number of farms in each area is shown in the last column of Table No. 29.

Table No. 29

APPROXIMATE ESTIMATE OF NUMBER OF NEW FARMS IN ULTIMATE DEVELOPMENT OF UPPER HELMAND

Name of the Project	*Number of Acres*	*New Farms*
Marja	21,190	1,651
Shamalan	12,325	1,219
Darweshan	15,846	1,488
Seraj	21,500	1,668
North Arghandab	10,235	1,028
Central Arghandab	11,375	1,029
Tarnak	24,675	2,231
Totals	117,146	10,314

Of the above possible new farms by area, it should be noted that under the recommended revised development program no additional settlers at this time will be contemplated for North Arghandab and very few, if any, in the Tarnak. In the Central Arghandab, it is possible that up to the indicated number of new farms may become available as development goes on.

The total ultimate cost of settlement, possibly by the end of 10 years, after development under Phases I and II, will approximate 103 million afghanis at the assumed rate of 10,000 afghanis per family of settlers. While accurate allocation is not possible, it may be estimated that about 60 million afghanis of this total, or about $3 million at the official exchange rate, will be expended through the end of Phase I.

Power Development Costs

Through June 26, 1956, $6,026,728 had been expended on power development, including appropriate allocations of the costs of the Kajakai and Arghandab Dams and of the Boghra Canal. On the basis of present estimates, an additional $3,842,000 would be required to complete the installation of 3,000 KVA now on order for Girishk and the recommended 6,400 KW for Arghandab, together with

the necessary transmission lines. In addition, about $200,000 more would be needed for the two 500 KW diesel units recommended for immediate procurement to ease the critical power situation at Kandahar and $300,000 for the Kandahar distribution system. The equipment for Girishk is already on order.

Industry Expenditures

The requirements for industrial investment, most of which would be private, cannot be estimated accurately at this time. The largest single item recommended for immediate development is the sugar mill at Lashkar Gah, which would probably cost between $1.0 and $1.5 million. Other projects specifically recommended, such as the government fruit research center, rehabilitation of the woolen mill, establishment of a small tannery, a small soap factory, and numerous other mechanized establishments, would cost varying amounts depending upon the number and nature of these establishments and the scale upon which each is constructed. It is assumed that the only government industrial investment will be the fruit research center, which may cost about $200,000 for the first two years. Total private industrial investment in the area might well be of the order of magnitude of $3 million. Assuming, as seems probable, that industrialization will proceed at an accelerated pace as the Valley's economy develops, this figure will be rapidly augmented from year to year. Presumably major enterprises requiring very substantial investment will be introduced as conditions warrant as, for example, a cotton textile mill, should cotton cultivation on the required scale prove practical, and a nitrogen fertilizer plant, after fertilizer demand expands sufficiently or earlier if an international market can be confirmed. For the purposes of the present analysis, however, an industrial investment of about $3 million over the next few years has been assumed.

Total Costs

On the basis of the foregoing estimates, total costs for all phases of the program may be summarized as shown in Table No. 30. As of the end of Phase I, aggregate public and industrial private expenditures would amount to $113 million, of which $67 million would be in foreign exchange (including about $60 million in dollars.) Through the end of Phase II, the total, excluding new industrial investment and land settlement, would rise to $131 million, including slightly over $80 million in foreign exchange.

It should not be concluded that the economic development of the Valley can or will, in fact, be limited to these calculated expenditures. The process of development, itself, will generate new demands for investment of all kinds. It may be assumed, however, that these additional demands will reflect this expansion of economic activity and that additional expenditures, far from constituting an added burden, will represent additional steps toward strengthening the economy not only of the Valley but of the nation.

Table No. 30
TOTAL ESTIMATED COSTS OF HELMAND VALLEY DEVELOPMENT

Item	In Thousands of Dollars All Currencies	Foreign Exchange
A. Costs to Date		
Irrigation and Land Development	62,680	
Power	6,027	
Highways, Surveys & Other Costs	12,460	
Lower Helmand Valley	2,017	
Total to Date	83,184	57,600
B. Estimated Costs, Phase I		
Irrigation and Land Development including Nad-i-Ali conversion to pasture and hay	17,158	3,275
Power—Total	4,342	
(Girishk)	(1,442)	
(Arghandab)	(2,400)	2,100
(Kandahar Diesel & Distribution)	(500)	425
Surveys, Bridges & Contingencies	582	450
Fertilizer Purchase Program	500	475
Land Settlement	3,000	
Cadastral Surveys	900	400
Industry—Public	200	125
Industry—Private	3,000	2,250
Total—Phase I	29,682	9,500
Total—Through Phase I	112,866	67,100
C. Estimated Costs—Phase II		
Irrigation and Land Development only	17,300	
Road and Bridge Construction	700	13,500
Grand Total	130,866	80,600

BENEFITS ACHIEVED TO DATE

Increase in Agricultural Production

Even at this early stage, the benefits reaped from the investment in the Helmand Valley are very substantial. Some of these benefits are directly calculable in dollar and cent terms; others are more difficult to compute or intangible in character but no less real and significant.

In the first category, the increase in land area irrigated annually since the improved and augmented water supply became available is known. (See Table No. 1 in Chapter II). In the Upper Helmand alone, the area increased from 144,000 acres to about 248,000, representing a net addition of 104,000 acres. In the Garm-

sel and Chakhansur areas of the Lower Valley, where 50,000 acres were cultivated previously, about 17,500 new acres have been added, bringing the total to some 67,-500 acres. For the Helmand Valley as a whole, therefore, acreage annually cultivated has expanded from 194,000 to almost 316,000, an increase of over 60 percent.

The value of the crops annually produced has increased sharply, not only because of the increase in cultivated acreage, but also because the output of old land has risen substantially as a result of the more adequate and reliable water supply, which has not only increased normal yields but also permitted some double cropping. The extent of these increases has been calculated on an area-by-area basis by using available information on cropping patterns, average yields, and crop values.

The first step in the procedure used was to make an estimate of the present value of crop production on the lands which were irrigated before the new water supplies became available. The acreages used for this purpose are those shown as "formerly" irrigated annually in Table No. 1. The acreage in each area was distributed to the various crops now being cultivated on the basis of aerial survey maps and on information obtained by field inspections and consultations with agricultural technicians. The amounts assigned to wheat varied from 60 per cent to 85 per cent. The remainder was assigned to fruit, grapes, forage, truck crops, corn, cotton and beans in varying percentages.

The yield of each crop was estimated on the basis of information furnished by the Helmand Valley Authority, the results of investigations by MKA, estimates of agricultural technicians, and information derived from field examinations and conferences. Consideration was given to the average soil classification in each area. As an example, the estimated yield for wheat varied from 240 pounds per acre in the Nad-i-Ali area to 720 pounds per acre in the Kajakai-Girishk area. Fruit yields varied from 1200 pounds per acre in the Tarnak area to 2500 pounds in the Kajakai-Girishk, Girishk-Shamalan and Central Arghandab areas. Unit prices used for the various crops were the actual retail prices in afghanis at the bazaar in Kandahar.

The gross value of each crop in each area was then obtained by multiplying acreages by yield and by price and summations for all crops were then made for each area. At this point the assumption was made that production on the old land has increased 80 per cent since the regulated water supply became available. This is believed to be conservative because much better yields have been obtained and partial losses of crops which undoubtedly occurred every year because of short water supplies have been avoided. By using this factor it was possible to determine for each area the increased production to date by areas. A further increase was estimated by assuming that a portion of the land in each area, excluding that devoted to fruit and grapes, is now being double-cropped. The percentage used for this purpose varied from 5 per cent to 15 per cent, depending on soils and convenience of the water supply.

For the new land which has been brought into production since the new water supplies became available, it was estimated that the distribution by crops would remain in the same ratios as estimated for the old land and that yields and prices would be the same. No allowance was made in this case for double-cropping. The figures for increases on old lands, the effect of double-cropping, and the output on new lands to date are summarized in Table No. 31.

Table No. 31

INCREASES IN CROP VALUES ALREADY ACHIEVED

(In Thousands of Afghanis)

Area	*Higher Output on Old Land*	*Double Cropping*	*Output of New Land*	*Total Increase*
Arghandab Valley [1]	58,200	5,500	44,200	107,900
Nad-i-Ali			5,200	5,200
Kajakai-Shamalan	12,300	2,800	19,700	34,800
Other Upper Helmand Project Areas [2]	16,900	1,800	38,600	57,300
Total—Upper Helmand	87,400	10,100	107,700	205,200
Garmsel-Chakhansur	19,300		13,500	32,800
Grand Total—Helmand Valley	106,700	10,100	121,200	238,000

NOTES:
[1] North and Central Arghandab and Tarnak.
[2] Seraj, Shamalan and Darweshan.

As indicated by the table, the value of the annual output of the entire Valley, calculated on the basis of present retail prices, has increased by some 238 million afghanis. The bulk of this increase, amounting to about 205 million afghanis, has been achieved in the Upper Valley. Slightly more than half of this total, or about 108 million afghanis, represents the production of the additional land brought under annual cultivation. The remainder, or slightly under 100 million afghanis, represents the increase in production made possible on the old land, including an estimated 10 million afghanis through double cropping. It is noteworthy that the estimated contribution of Nad-i-Ali to this increase is only about 5 million afghanis. The great bulk has come from areas previously settled. This indicates the extent to which preoccupation with the relatively low productivity of the Nad-i-Ali area has tended to obscure the very large benefits derived from the project as a whole.

The Lower Valley also has shared, though to a considerably lesser extent, in the benefits of better water supply, showing an increase of 33 million afghanis in the value of output, of which about 19 million afghanis represents the higher output of the old land.

If the afghani benefits shown above are translated into dollars at the official

exchange rate, the annual increase in output in the Upper Helmand Valley would be slightly less than $10 million annually. Even at a much less favorable exchange rate, the annual increment in value would still be at least $5 million. Considering the fact that the benefits so far have been achieved very largely from cultivation of the old settled areas and that the new settlements may be expected to increase their contributions very rapidly as the program progresses, there is every reason to regard this direct return on the investment of some $63 million in the Upper Helmand as very gratifying.

Other Estimated Benefits from Helmand Valley Development to Date

In addition to these direct benefits in increased agricultural output, there are other tangible and intangible benefits which should be taken into account in appraising results to date.

FLOOD CONTROL. Although the storage reservoirs are operated primarily for irrigation purposes, they do, nevertheless, give a substantial measure of flood control with resulting reduction or elimination of flood damage to low lying areas. Further flood control benefits from Kajakai reservoir could be realized if the storage were drawn down to a low level prior to each flood season as suggested in Chapter II.

TRAINING. There are no accurate statistics bearing directly upon the number of Afghan employees trained in the various aspects of MKA's construction work, but it is generally recognized that the company has done an outstanding job in such training. Employment figures show hirings of Afghan employees in all categories over the past year at the rate of at least 5,000 a year. If this rate were projected over the 10 years of MKA's work in Afghanistan, it would be apparent that tens of thousands of Afghans have benefited from practical training. Employees of the company have shown remarkable aptitude for many of the skilled and semi-skilled jobs involved in construction work and many former employees have been hired by other employers throughout the country. If the training of these men had been undertaken as a separate function, rather than as an integrated part of MKA operations, it would undoubtedly have cost several million dollars.

SIGNIFICANT PUBLIC WORKS. While there is a tendency to attribute all project costs to land development, there are, nevertheless, many other real benefits which have been produced as by-products of MKA construction and land development work. Among these are the regional roads and highways, which constitute a direct economic and social benefit to the nation. In addition, the contractor has constructed large oil storage facilities, water systems, semi-permanent camps, workshops and repair facilities. At the termination of the MKA contract, all of the buildings, equipment, and facilities of the company will be turned over to the Government of Afghanistan. Taken together these installations will constitute a lasting benefit to the economy of the region.

SOCIAL BENEFITS - SETTLEMENT. Substantial benefits have also been realized in more intangible social terms. One of the most discernible benefits of this type

is apparent in connection with the settling of people on the new land. The stability, opportunities for education and better health afforded a portion of the country's nomad population have real value. The economic benefit, of course, is at present limited and will continue to be so to the degree that the new government-owned land allocated to settlers continues to be the lower class land which involves many difficult problems of reclamation.

Revenues and Foreign Exchange Returns

As pointed out in Chapter IX, the increase in direct government revenues has so far been limited, though far from insignificant. This reflects not only the fact that the development is as yet in its early stages but also the limitations of a tax structure which is not geared to securing as much return from those benefiting from the program as might perhaps be possible, though not necessarily desirable, at this stage.

The government's foreign exchange position has benefited directly from the increase in Valley exports which the higher agricultural output has made possible. As pointed out in Chapter IX, while definite figures showing the trend of exports originating in the Valley are not available, it is clear that there has been a substantial expansion in the last few years in exports of dried and fresh fruit and probably of wool and hides.

FUTURE BENEFITS

Argiculture

INCREASE IN ACREAGE. The program recommended herein would make available for cultivation an additional 81,000 acres upon completion of Phase I and would later provide another 80,000 acres as shown in detail in Table No. 32.

INCREASE IN PRODUCTION. The value of production that may be expected from this additional land was calculated on the same basis as that used for benefits achieved to date. The indicated increment in value of output for the new acreage is about 89 million afghanis at the end of Phase I, of which about half would be derived from the Arghandab area and half from the three Helmand areas. Phase II should yield another 16 million afghanis from the Seraj and Lower Darweshan and about 38 million from the Tarnak, making 54 million in all. By the end of Phase II, therefore, the total increase in output above present levels should be about 143 million afghanis.

Total direct agricultural benefits achieved to date and anticipated at the ends of Phase I and Phase II work, respectively, may now be compared with the costs of irrigation and land development in each case. This is shown in Table No. 33, in which the benefits are converted into dollars at both the official rate and the much less favorable rate of 40 afghanis to the dollar. It should be borne in mind that the conversion factor used for afghani costs was the official rate throughout. When both costs and benefits are compared on the basis of the official conversion rates, the benefits are probably somewhat over-stated. On the other hand, the comparison

Table No. 32

ACREAGES PRODUCED BY PHASES I AND II

Area	Now Cultivated Annually	Additions Under Phase	Available After Completion of Phase
Phase I			
Marja	6,000	21,190	27,190
Upper Darweshan	12,000	21,849	33,849
Shamalan	30,000	12,325	42,325
Subtotal—Helmand Areas	48,000	55,364	103,364
North Arghandab	26,800	13,435	40,235
Central Arghandab	68,200	12,275	80,475
Subtotal—Arghandab Valley	95,000	25,710	120,710
Totals—Phase I	143,000	81,074	224,074
Phase II			
Tarnak	15,000	48,350	63,350
Lower Darweshan	6,500	10,424	16,924
Seraj	35,000	21,500	56,500
Totals—Phase II	56,500	80,274	136,774

Table No. 33

COMPARISON OF IRRIGATION AND LAND DEVELOPMENT COSTS AND DIRECT ARGICULTURAL BENEFITS UPPER HELMAND VALLEY

Period	Total Costs	Annual Benefits		
			Millions of Dollars	
	Millions of Dollars	Millions of Afghanis	At 21.26 afs/dollar	At 40 afs/dollar
June 1956	62.7	205	9.6	5.1
After Phase I	79.8	294	13.8	7.4
After Phase II	97.1	348	16.4	8.7

with benefits converted at the 40 afghani rate may be regarded as distinctly conservative.

This calculation indicates, in the first place, that the direct benefits from increased crop output, conservatively calculated, are at least commensurate with the investment made and, secondly, that the added investment will yield more than proportional benefits, particularly for Phase I.

Table No. 1

LAND AREAS BENEFITED BY IRRIGATION WORKS

Area Name	Type of Service	Acreages Irrigated Annually Formerly	Now	Ultimate
Arghandab Valley				
North Arghandab	Regulated Supply	25,000	26,800	40,235
Central Arghandab	Regulated Supply	45,000	68,200	80,475
Tarnak	Distribution	15,000	15,000	63,350
Sub-total		85,000	110,000	184,060
Upper Helmand				
Kajakai-Shamalan	Regulated Supply	17,500	36,500	45,500
Seraj	Limited Distribution	20,000	35,000	63,000
Nad-i-Ali	Distribution	0	12,345	18,500
Marja	Distribution	0	6,000	27,190
Shamalan	Distribution	15,000	30,000	42,325
Darweshan	Distribution	6,500	18,500	50,773
Sub-total		59,000	138,345	247,288
Total, Upper Helmand		144,000	248,345	431,348
Lower Helmand				
Garmsel	Regulated Supply	10,000	17,500	43,475
Chakhansur	Regulated Supply	40,000	50,000	65,000
Sub-total		50,000	67,500	108,475
Grand Total		194,000	315,845	539,823

In the above table, acreages irrigated "Formerly" are those which were irrigated by diversion of the irregular and intermittent flows of the unregulated rivers prior to completion of the present storage reservoirs and canals. All of the acreage in the column head "Formerly" has benefited by the new construction. The type of service which will be rendered in each project area is indicated in the second column. "Regulated Supply" means that the only direct benefit provided by the present construction program will be the delivery of augmented and regulated water supplies at the intakes of the old canal systems. "Distribution" means that the areas so designated will receive not only an augmented and regulated supply but will also be served by a new or improved system of irrigation canals.

WATER SUPPLY

The water supply for the current Helmand Valley development is taken from the Helmand River and its main tributary, the Arghandab River, at the points where they emerge from the hills onto the Valley lands. Runoff measurements of

FERTILIZER. The above calculations have all been made on the basis of essentially present farming techniques. As pointed out in Chapter III, however, a very substantial further increase can be obtained from the proper use of fertilizer. It is estimated that, for the new lands that would be under cultivation at the end of Phase I, fertilizer could expand the value of the yield by 150 million afghanis annually. This would be equivalent to about $7 million at the official exchange rate, or almost $4 million at the 40 afghani rate. Even at the less favorable rate, this would be nearly eight times the $500,000 representing the estimated total cost of the fertilizer program.

GROSS AND NET AGRICULTURAL BENEFITS. Including fertilizer, total gross agricultural benefits by the end of Phase II would thus become 504 million afghanis, equivalent to $25 million at the official rate or nearly $13 million at the 40 afghani rate. These estimates of agricultural benefits have all been calculated, as noted, on the basis of retail prices now prevailing. They thus include, implicity, an allowance for the increase of transport and commerce related to the marketing of these commodities, but they. nevertheless, represent the best measure of the economic growth engendered in the Valley as a direct result of the irrigation and land development program.

Only a part of the gross benefits will go to the farmers in the form of increased net income. The data available are not adequate to permit calculation of the proportions of the total that will accrue to them and to the local merchants and the people providing transport. Nor is it feasible to compute the net benefits to the community resulting from the rise in agricultural output, as distinct from the gross benefits estimated above. The necessary information as to farming, transport, and merchandizing costs is not available. Adopting a conservative approach, these costs would certainly not exceed two-thirds of the retail value. On this basis, total net benefits from irrigation, land development, and fertilizer would be a minimum of 170 million afghanis yearly after the recommended development work has been completed and the inevitable initial difficulties overcome. However, it should be borne in mind that a large part of the production costs and selling call for labor and reflect the creation of new work opportunities in a community in which such opportunities are urgently needed. It is for this reason that the gross benefits are regarded as more truly representative of what the program has accomplished and should achieve in the future.

Power and Industry

So far, additional electric generating capacity called for in the program has not yet been installed, and no major industrial projects have been undertaken. There has undoubtedly been, however, a substantial increase in smaller scale industrial operations as a result of the general stimulus to economic growth in the Valley. This is attested, for example, by the introduction of the various minor mechanized plants in the Kandahar area, described in Chapter VIII, and by the HVA handicraft industries set up in Lashkar Gah. Cottage industry output has

almost surely risen to meet the consumer demand engendered by MKA employment and government expenditures generally in the Valley.

Major industrial expansion must await the availability of more power. As in the case of industrial development costs, the benefits which will result from increased electric and industrial output are hard to estimate precisely. Any reasonable estimate made today is almost sure to be on the low side. The Girishk and Kandahar power projects and the recommended sugar mill should alone add a minimum of 50 million afghanis to the value of output within four or five years. It was shown in Chapter VIII that the recommended power development should readily pay for itself in power revenue directly, without taking into account its broader economic impact. Any similar attempt to compare costs and benefits for industrial development would be largely futile. Industrial expansion, once started on a sound basis, tends to grow at an accelerating pace and to outrun forecasts very rapidly.

However, added to the previously calculated increase of 504 million afghanis in the value of agricultural production by the end of Phase II, expanding power and industrial output should bring total gross benefits to at least 550 million afghanis, or about $25 million at the official exchange rate.

Foreign Exchange Benefits

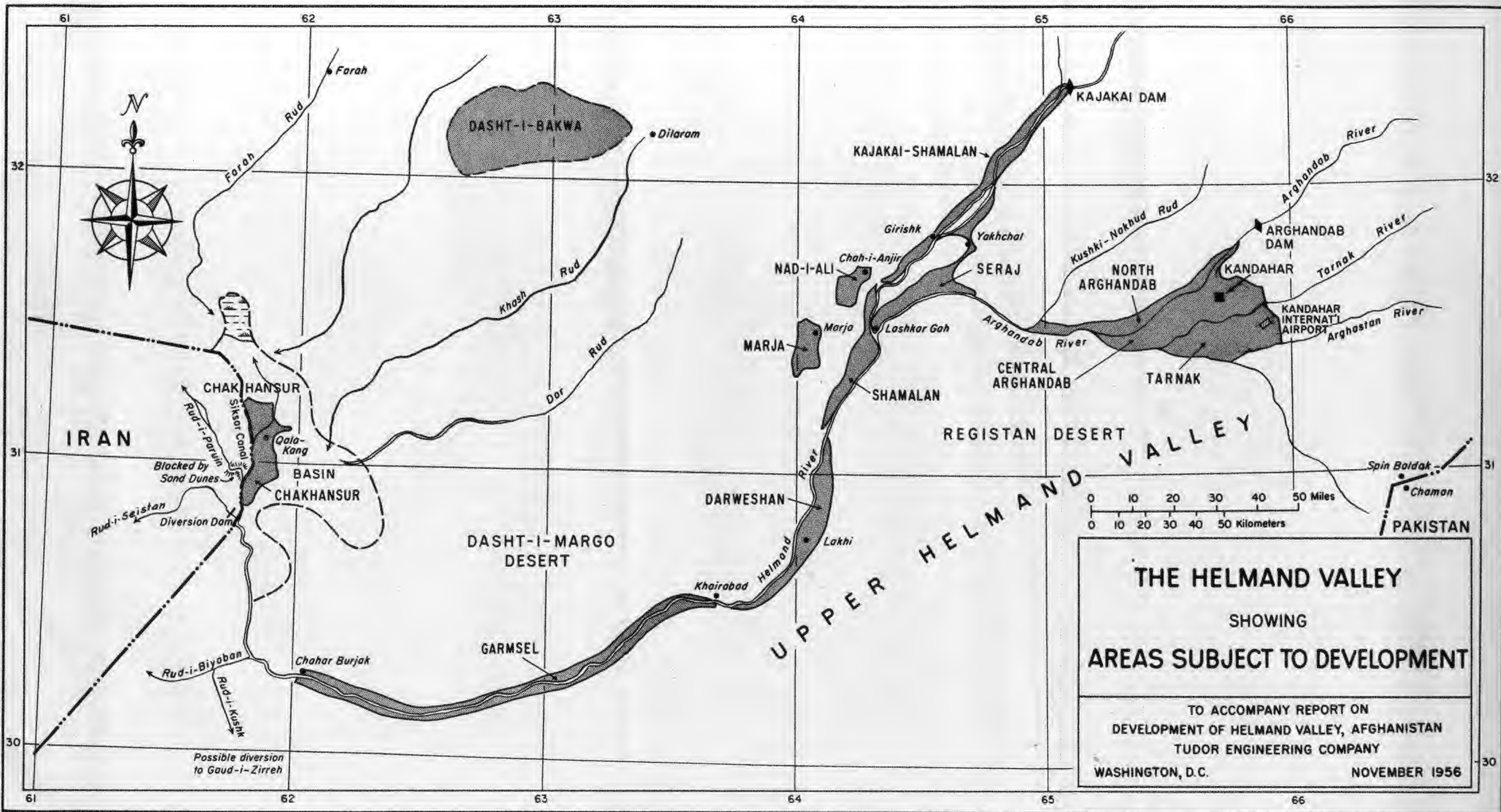
The foreign exchange benefits accruing from the program are difficult to calculate accurately but will be quite substantial. Such benefits will come both from increased export of some products and the reduced import of others. With respect to the former, fruit exports should expand further both by virtue of increased production and through the introduction of better handling, processing, and transporting methods. More and better pasture lands should be reflected in larger output and export of wool and hides. Introduction of modern tanning methods should add to the unit value of the hides that are exported.

Foreign exchange savings, resulting from the program recommended, would certainly be produced by the substitution of internally produced for imported sugar, as well as by a reduction in leather imports following upon better tanning of domestic hides and skins. If establishment of a cotton mill proves feasible, cotton cloth imports can be curtailed correspondingly. More efficient use of the woolen mill would also save foreign exchange.

The omission of any specific figures indicating the extent of these additional earnings and savings of foreign exchange is deliberate. While estimates can be made, they are likely to be misleading, since the effects of the general economic development of the region upon its foreign exchange balance will be far more complex and significant than any partial calculations of this kind could show.

THE RELATION OF ECONOMIC BENEFITS TO REVENUE

It is evident from the foregoing analysis that the benefits to the economy of the Valley from the work that has been done to date are already substantial and


THE HELMAND VALLEY
SHOWING
AREAS SUBJECT TO DEVELOPMENT
TO ACCOMPANY REPORT ON
DEVELOPMENT OF HELMAND VALLEY, AFGHANISTAN
TUDOR ENGINEERING COMPANY
WASHINGTON, D.C.
NOVEMBER 1956
KAJAKAI DAM
KAJAKAI-SHAMALAN
ARGHANDAB DAM
KANDAHAR
KANDAHAR INTERNAT'L AIRPORT
NORTH ARGHANDAB
CENTRAL ARGHANDAB
TARNAK
SERAJ
NAD-I-ALI
MARJA
SHAMALAN
DARWESHAN
GARMSEL
REGISTAN DESERT
UPPER HELMAND VALLEY
DASHT-I-MARGO DESERT
DASHT-I-BAKWA
IRAN
PAKISTAN
CHAKHANSUR
CHAK HANSUR BASIN
Farah
Farah Rud
Khash Rud
Dor Rud
Dilaram
Girishk
Yakhchal
Chah-i-Anjir
Marja
Lashkar Gah
Lakhi
Khairabad
Helmand River
Chahar Burjak
Qala-Kang
Siksar Canal
Rud-i-Paruin
Blocked by Sand Dunes
Rud-i-Seistan
Diversion Dam
Rud-i-Biyaban
Rud-i-Kushk
Possible diversion to Gaud-i-Zirreh
Kushki-Nakhud Rud
Arghandab River
Tarnak River
Arghastan River
Spin Boldak
Chaman
0 10 20 30 40 50 Miles
0 10 20 30 40 50 Kilometers
N

that they will be augmented rapidly as additional land is brought into production, electric power is brought in, and industry expanded. Obviously, this dynamic development in the Valley will have a broad impact upon the economy of Afghanistan as a whole.

However, neither the gross nor the net benefit to the economy from the recommended development can be translated directly into an expansion of government revenues as such. These revenues will, of course, increase in line with the general expansion of activity as well as through the collection of the presently proposed one-time tax at the rate of 500 afghanis per acre to be levied against old owned land benefited by the improved water supply. This would yield about 200 million afghanis, or approximately $9 million, at the official exchange rate.

In addition to the one-time water charge on old land, the government is planning to apply a charge to new land at the rate of 600 afghanis per acre, which should yield an additional one-time payment of approximately 120 million afghanis. This, however, will be collected from the settlers over a period of 20 years.

With regard to recurring revenues, the government anticipates levying an annual water-use tax averaging approximately 2 afghanis per acre, which will yield a maximum of 1 million afghanis per year. This is obviously inadequate to cover HVA operations and maintenance costs, which, as shown in Chapter VI, will run about $1.80 per acre, the equivalent of about 38 afghanis per acre. The return from land taxes in the Valley is extremely low. According to the local governors, land taxes yielded only 1.3 million afghanis in Kandahar and Girishk provinces combined in 1953-54. All taxes, aside from customs, show the low tax rates now applying in the area.

It seems quite apparent that the government's land-tax rates in the Valley should be raised on the land already in cultivation. Caution, however, must be used in raising the rates for land that is not yet fully developed. Something along the lines of a sliding scale of rising rates over a period of 10 years might be applicable in the development area. Water-use rates must also be increased if the government desires to recover all or a major part of the 38 afghanis cost per acre per year for operation and maintenance.

Agriculture is not the only source from which increased government revenue will be derived. Taxes on the profits of expanding industrial activity in the Valley should yield substantial amounts, though consideration should be given to the devising of a program of taxation that will stimulate rather than discourage both initial private investment and reinvestment of profits earned. Added revenues will also be derived from the activities of enterprises which are wholly or partly government owned.

At the same time, it must be recognized that, as far as the government itself is concerned, operations in the Valley will have to be subsidized, at least for the time being. The government cannot recover all its investment in the program di-

rectly, although the country as a whole will recover it many times over. Total government investment in the Valley by the end of Phase II, as calculated earlier in this chapter, should be about $128 million. The proposed one-time return from old lands for improved water supply and from new lands should yield about 320 million afghanis, or about $15 million at the official exchange rate. This would leave a net investment of about $113 million in all currencies to be amortized.

Over a 50-year period, this would require an annual amortization of $2.26 million. In addition interest payments would approximate an average of $2.7 million per year at the rate of 4 percent on local currency expenditures and 4-½ percent on dollar investment. The total annual capital cost, therefore, would average about $5 million per year. The government's share of the revenue from power sales and other enterprises in which it has an interest, plus increased taxes from industry and other non-agricultural resources should yield at least $1 million, leaving a net servicing obligation of approximately $4 million per year. If one were to spread this over the acreage which is anticipated to be under cultivation in approximately eight years, it would average an annual debt-servicing charge of approximately $8, or approximately 170 afghanis, per acre. While a portion of this undoubtedly must be carried by the government, it is possible that taxes on land, graduated by class of soil, might average as much as 75 to 85 afghanis per acre.

The principal difficulty with this analysis, of course, is that it deals with a 50-year period, beginning some eight years from now. In the meantime, the government's obligations on its investment are requiring debt servicing. It is believed that this must be a recognized interim burden, which must draw much of the foreign exchange necessary for repayment of loans from other earnings and savings until the project begins to generate its own repayment capacity. This repayment capacity in foreign exchange terms will not be apparent in any direct revenues of the Helmand Valley Authority but will be evident only in the national balance of payments accounts. This will be particularly evident when the government at some future time successfully initiates its plan to take over all free market foreign exchange earnings.

APPENDICES

Appendix I
MEMBERS OF HELMAND VALLEY SURVEY TEAM

GOVERNOR LEONARD B. JORDAN, Team Leader

Governor Jordan is an executive and business man, with broad experience in farming and raising of livestock. He was formerly Governor of the State of Idaho. During the period of the survey, he was on leave from his present position as Chairman of the U. S. Section, International Joint Commission with Canada on the use of boundary water resources.

MR. RALPH G. WADSWORTH, Civil Engineer, Assistant Team Leader

Mr. Wadsworth is a graduate of the University of California, a Registered Civil Engineer in California and a Member of the American Society of Civil Engineers. He was employed for twenty years on various large irrigation and reclamation projects in the Sacramento Valley in California. For several years he supervised the engineering phases of Federal work programs of all types in the State. From 1945 to 1955 he was City Engineer of the City and County of San Francisco.

MR. CLIFFORD E. PLUMMER, Chief Engineer, Modesto Irrigation District, Calif.

Mr. Plummer was educated in Canada and is a graduate of The Sprott Shaw Institute in radio. From 1923 to 1936 he was employed by the Turlock Irrigation District, the last seven years as Superintendent of Electrical Distribution. From 1936 to 1943 he was Chief Electrical Engineer of Modesto Irrigation District; and since 1943 has been Chief Engineer in charge of all construction, maintenance and operation. He is a member of State of California's Central Valley Regional Water Pollution Control Board, a Registered Professional Electrical Engineer in the State of California, and a member of the American Institute of Electrical Engineers since 1931.

DR. MILTON FIREMAN, Soils Specialist

Dr. Fireman is a member of the Agricultural Extension Service of The University of California, in charge of problems relating to saline and alkali soils and irrigation water quality in California. He has published papers on soil analysis, cation exchange, soil permeability, and on the characteristics and reclamation of saline and alkali areas. Dr. Fireman is a graduate of the University of Arizona and received his doctorate from the University of California, Berkeley. Before joining the staff of the Agricultural Extension Service, he was with the U. S. Salinity Laboratory, Riverside, California, Agricultural Research Service. He has had special assignments with the Economic Cooperation Administration in Greece and Turkey.

DR. GORDON MACGREGOR, Rural Development Specialist

Dr. Macgregor is presently employed by the Conference Board of Associated Research Councils of Washington, D. C. as a Research Associate with the Committee on the International Exchange of Persons (Fulbright Program). He has served successively as Applied Anthropologist and Superintendent with the Bureau of Indian Affairs, Social Economist with the Missouri River Basin Investigations, and Pacific Specialist with the Office of Territories. With the Technical Cooperation Administration he participated in setting up the first Village Development Programs in Iran and Iraq and was officer in charge of regional projects in the Near East and Africa. He is a graduate of Yale College, B.A., and Harvard University, PH.D., and is President of the Society for Applied Anthropology.

MR. J. ROBERT FLUKER, Economist

Mr. Fluker is an economist now engaged as Economic Counselor for American Economic Affairs at the United States Embassy, New Delhi, India.

MR. SAUL NELSON, Industrial Economist

Mr. Nelson is a graduate of Massachusetts Institute of Technology. He was Chief of the Germany-Austria Branch of the Economic Cooperation Administration, 1948-1951; Chief Economist of the Office of Price Stabilization, 1951-1953; Industrial Economist and Deputy General Manager, Robert R. Nathan group of economic consultants to the Government of Burma, advising the government on its industrial development program, 1953-55; and is now an Economic Consultant, Washington, D. C.

MR. FRANK A. SMONSKEY, JR., Secretary-Reporter

Mr. Smonskey is presently employed by the Alderson Reporting Company of Washington, D. C. as a Stenotype Reporter. He is a Congressional, Court, and Convention Reporter.

Appendix II

COMPREHENSIVE SURVEY OF THE HELMAND VALLEY DEVELOPMENT—AFGHANISTAN (ICA DIRECTIVE)

I. PURPOSE OF SURVEY

To review the potentials for development of the Helmand Valley in Afghanistan; to review the extent of development to date; and to recommend with specific regard to the abilities and desires of the Government of Afghanistan and the present and potential population in the Helmand Valley, a program for the completion, operation and management of the initial development, and a program for further development related to the Upper Valley of the Helmand, including ways and means for the establishment of viable village life in terms of human welfare, social organizations, et cetera. (as used hereinafter, Upper Valley shall mean all lands which may be served from the waters of the Helmand and its tributaries up stream from Khairabad.) The survey will not include plans for development in the lower basin (down stream from Khairabad).

PRIORITY: It shall be recognized that priority has been given to rural and agricultural development and all recommendations in regard to the extent of agricultural development and proposed industrial development shall be with due regard to the limited availability of Afghanistan personnel. Time schedules for starting industrial units shall be so phased as not to detract from the initial and basic objectives of a sound and viable farm economy.

II. SCOPE OF SURVEY

The survey will cover four main aspects:

(a) A review of the existing status of the project, and related factors in Afghanistan, to determine how well the project is adapted to accomplish the purposes it was intended to serve, taking into account the original objectives of the project.

(b) An analysis of the present implementation of the project taking into account engineering, construction, management and operation, coordination between various parties, and the effectiveness of planning and execution of programs for achieving maximum utilization of its present and potential benefits, including analysis of the nature and extent of presently developed farming communities.

(c) Recommendation for the effective completion and execution of the project.

(d) Consideration of the capacity of the Afghan Government and the Afghan economy to carry the burden of the Helmand Valley development project.

The survey shall include but not be limited to consideration of the following:

1. Water Supplies:

Review of available water resources of Helmand and Arghandab rivers, needs of the Upper Valley and balance available for the development of other areas.

2. Land Suitability:

(a) Review suitability of the areas now under development or proposed for development for irrigation in the Upper Valley. In the event available land classification studies are not ample for determination of suitability, recommend appropriate land classification investigations.

(b) Recommend realistic plan and schedule of agricultural development of these lands proposing as may be required (1) construction of lateral canal and farm ditches; (2) construction of drainage systems; (3) preparation of land, including grading and special cropping practices, such as plowing under for several successive years the crops required to develop soil fertility.

3. Storage:

(a) Potential utilization of Kajakai storage for irrigation of lands in Upper Valley and its general relationship to delivery of water to lands in Lower Basin in both Afghanistan and Iran.

(b) Potential utilization of Arghandab storage for irrigation of lands in the Arghandab sub-basin.

4. Required Construction:

(a) Construction work required for the completion of the initial development in the Upper Basin including roads, villages, et cetera.

5. Land Settlement Program:

(a) Study of economic size of family farm units.

(b) Propose realistic plan and rate of settlement in villages, or on economic-sized family farm units.

(c) Suggest effective administrative procedures for a coordinated village development including housing, health and sanitation, educational and other individual or community facilities.

(d) Suggest program for coordinated technical assistance and guidance to settlers to include all functional fields as agriculture, education, health and sanitation, housing, community development, et cetera.

(e) Suggest program of necessary assistance to settlers, and method of financing this program, such as loans, housing materials, health facilities, potable water supplies, et cetera.

(f) Suggest water and land tax programs for lands receiving supplemental and total water supply from HVA installations.

DEVELOPMENT OF HELMAND VALLEY, AFGHANISTAN

SUMMARY OF CONCLUSIONS

The principal conclusions which may be drawn from the following report are summarized briefly below. References to report chapter numbers are shown where appropriate.

1. GENERAL. The development of the Helmand Valley, which has been actively underway for the past 10 years, is primarily an irrigation and land development project with incidental provisions for flood control and power development. Its purpose, according to Afghan officials, is to provide permanent farm homes for large numbers of new settlers, raise standards of living in the Valley, produce crops for foreign export, provide power and flood control and eventually repay the cost of construction. (Chapter II)

2. CONSTRUCTION. Construction of dams, canals, roads, main drainage ditches and structures has been carried out in a first-class manner in accordance with American construction standards by the Afghan Government's contractor, Morrison-Knudsen Afghanistan, Inc. (MKA). Engineering surveys and plans have been made by the same company or its affiliate, the International Engineering Company of San Francisco. Planning has lagged somewhat behind construction, but all canals and structures have functioned satisfactorily. Dollar funds for construction work under the current (third) MKA contract will be exhausted in the Fall of 1957, at which time about 68 percent of the work outlined in this contract will have been completed. (Chapter IV)

3. WATER SUPPLY. Upon completion of the development program now authorized and under way, 202,138 acres of land are scheduled to receive irrigation water through newly constructed distribution systems, and an additional 337,685 acres will receive an augmented and regulated water supply for use through existing privately-owned canals. The water supply created by the reservoirs will be ample for the irrigation of all project lands along the Helmand River and will provide an adequate supply for the areas now under cultivation on either side of the Arghandab River. In a critical water year, it is doubtful if a satisfactory water supply from presently developed sources can be made available to the whole of the adjoining partially developed area south of the Arghandab River referred to as the Tarnak area. (Chapter II)

4. LANDS. The irrigated lands are largely located on valley fill and old river terrace soils along the principal rivers of the Valley and have been farmed for many hundreds of years, although mostly on an intermittent basis. Fertility is moderate to low and a large percentage of most of the areas requires extensive drainage and reclamation measures. Estimates made in the past as to the amount of irrigable land in the various areas and as to the probable increases in crop

6. Power Resources and Utilization:

(a) Power study including potential from Kajakai dam, Arghandab dam and canal drops;

(b) Market potentialities and proposed distribution systems;

(c) Priority and rate of development.

7. Industrial Potentialities:

(a) Processing of agricultural products and marketing requirements;

(b) Other industrial development, including potentials for small industry, cottage industry, and handicrafts to meet local consumer needs and develop export potential;

(c) Transportation requirements;

(d) Projected rate of development.

8. Administration of Helmand Valley Authority:

(a) (1) Review HVA responsibilities in terms of a realistic appraisal of the requirements for effective administration of the Valley Development and for coordination with other Afghan authorities and agencies. (2) Recommend such reorganization of the administration of the Helmand Valley development as may be required.

(b) Review present administrative organization and operations of HVA, including: (1) functions assigned, (2) relations with other organizations, (3) organization pattern, (4) procedures for planning, directing, controlling and reporting on operations, (5) present staff, (6) training facilities.

(c) Propose suitable means of meeting current management and operating problems during time required for Afghanistan to develop an effective organization capable of carrying out HVA responsibilities.

(d) Recommend adequate training program including on-the-job and formal training in Afghanistan and in other countries.

(e) Review present physical facilities and equipment, including that to be available from the present construction program, and recommend such additional facilities and equipment (such as maintenance shops, et cetera), which may be necessary to carry out HVA responsibilities. Estimate of cost.

(f) Estimates of time period required, domestic and foreign costs of interim management support program proposed in items (c) and (d).

9. Effective Utilization of the Project:

(a) Analysis of the problems involved in achieving land settlement and agricultural output, and industrial and power development programs, taking

into consideration present cultural climate, attitudes and capabilities of the Afghan people.

(b) Suggest the applicable techniques which are required to solve these problems, such as incentive plans, agricultural extension services, training and education activities, industrial technical assistance, loan facilities, service facilities, et cetera.

(c) Recommend a specific program for achieving definite targets within a realistic time for land settlement, agricultural output, industrial and power development.

(d) Provide estimates of time required, types of resources, and domestic and foreign costs of this program.

10. Fiscal Analysis:

(a) Estimated cost of initial and proposed development in Upper Valley.

(b) Estimated annual costs of maintenance and operation of initial and proposed development.

(c) Analysis of net annual return from present and proposed development.

(d) Analysis of revenue potential of initial and proposed projects, including but not limited to power revenue. water and land taxes, irrigation fees, other taxes.

11. Economic Analysis:

(a) Appraisal of benefits realized to date from the project, including economic contributions resulting from flood control, increased rural and town development (such as Kandahar), agricultural output, employment, improved transportation, increased per capita income, et cetera.

(b) Appraisal of benefits to be reized from proposed developments.

Appendix III
GLOSSARY

Term	Definition
Monetary Units	
Afghani	Basic unit of currency in Afghanistan, consisting of 100 puls. At the official exchange rate 21.266098 afghanis equal 1 dollar. At the free market rate 56 afghanis equal 1 dollar.
Rupee	Basic unit of currency in Pakistan, consisting of 16 annas. Present value approximately 22 cents, or approximately 4-½ rupees equal 1 dollar.
Units of Weight	
Kharwar	Weight equivalent to 80 seers; 1,280 pounds, or approximately ⅝ ton.
Kilogram	Weight equivalent to 2.2046 pounds.
Seer	Afghan weight equivalent to 16 pounds.
Units of Measurement	
Acre foot	Volume of water equivalent to 1 foot depth over 1 acre.
Second feet	Measurement of flow of water, cubic feet per second.
Jeribe (Ji-reeb')	Area equal to 0.482 acres. 1 acre equals 2.07 jeribes.
Meter	Length equal to 39.37 inches or 3.28 feet.
Kilometer	Length equal to 0.621 miles (approximately ⅝ mile). 1 Mile equal to 1.61 kilometers (approximately 8/5 kilometers.)
Words used in Text	
Bazaar	A market place or assemblage of shops.
Chadries	Long veils worn by Afghan women.
Haj	Pilgrimages to Mecca.
Pushtu (Pashto)	Most commonly spoken language in Southern Afghanistan.
Sherkat	Joint-stock company owned partly by government and partly by private enterprise.
Abbreviations	
ac. ft.	Acre feet
ACU	Afghan Construction Unit
Af(s)	Afghani(s)
CIF	Cost, insurance and freight paid
Eximbank	United States Export-Import Bank
GOA	Government of Afghanistan
HP	Horsepower
HVA	Helmand Valley Authority

Term	Definition
Abbreviations (continued)	
IBRD	International Bank for Reconstruction and Development
ICA	International Cooperation Administration
IMF	International Monetary Fund
Km.	Kilometer (s)
KVA	Kilovolt-ampere
KW	Kilowatt
KWH	Kilowatt-hour
MKA	Morrison-Knudsen Afghanistan, Inc.
NEF	Near East Foundation
UNESCO	United Nations Educational, Scientific and Cultural Organization
ppm	Parts per million
sec. ft.	Second feet
UN-FAO	United Nations-Food and Agriculture Organization
USOM/A	United States Operations Mission to Afghanistan

these two streams were started by MKA and later taken over by HVA with the assistance of two hydrologists of the United States Geological Survey (USGS) assigned to the ICA technical staff. The points of measurement are located on the Helmand River at a point 2 kilometers downstream from the Kajakai Dam and on the Arghandab River at a point 3.5 kilometers downstream from the Arghandab Dam. Records of flow are also available on the Arghandab River at a point about 30 kilometers upstream from the dam.

Table No. 2 shows the annual runoff of the two streams by seasons (October 1 to September 30) for the eight-year period from October 1947 through September 1955.

Table No. 2

ANNUAL RUNOFF HELMAND AND ARGHANDAB RIVERS

12- Month Period Ending Sept. 30	*Runoff in Acre Feet* Helmand River Below Dam	*Arghandab River At Reservoir*
1947–48	3,885,160	574,010
1948–49	5,193,500	872,970
1949–50	5,256,000	1,144,970
1950–51	6,171,000	1,042,900
1951–52	4,827,000	816,410
1952–53	3,611,200	493,800
1953–54	5,186,600	1,358,000
1954–55	3,831,100	464,100
Average 8-Year Period	4,745,195	845,895

NOTE:

All figures from reports compiled by USGS.

Runoff shown for Arghandab River was measured below reservoir site from 1947 to 1951 and above reservoir from 1952 to 1955.

Helmand River Supply

The drainage area of the Helmand River above the measuring station is approximately 16,300 square miles. During the eight-year period of record, the annual runoff has varied from a minimum of 3,611,200 acre feet in 1952-53 to a maximum of 6,171,000 acre feet in 1950-51, with an average for the period of 4,745,195 acre feet. A maximum natural flow of 50,100 second feet was recorded on April 26 or 27, 1949. Prior to construction of the Kajakai Dam, the lowest natural flow was 1,620 second feet on July 22, 1953.

With a storage capacity of 1,495,000 acre feet in Kajakai Reservoir and river flows of the magnitudes stated, there is more than ample water to irrigate project lands as presently proposed even in a year of minimum flow. The area served from the Helmand River, down to and including the Darweshan area, is 247,288 acres as shown in Table No. 1. The gross irrigation requirement is estimated to be 1,360,-

000 acre feet. The difference of 2,251,200 acre feet between the minimum annual flow and the project requirement would be ample for other likely developments in the Garmsel and Chakhansur areas or possible diversion to Dasht-i-Bakwa and would still adequately meet any legitimate claims of Iran for water to be used in the Seistan Basin.

Arghandab River Supply

The drainage area of the Arghandab River above Arghandab Dam is 6,870 square miles, of which 640 square miles is believed to be noncontributing. The net area above the gaging station located upstream from the reservoir is 5,900 square miles.

Records of the seasonal unregulated runoff of the Arghandab River for the eight-year period of record from 1947 to 1955 indicate a maximum flow of 1,358,-000 acre feet in the 1953-54 season and a minimum flow of 464,100 acre feet in the 1954-55 season. The average for the period is 845,895 acre feet per year. There were four years in which the runoff was below the average, the flow in the minimum year being only about 55 percent of the average.

Arghandab Reservoir has a storage capacity of 388,000 acre feet above the outlet valves. The spring runoff of the river usually commences in February and ends in May. From July on, the reservoir inflow is very small and sometimes falls as low as 71 second feet. Irrigation, therefore, is primarily dependent on releases from storage after the month of May. Since the dam was completed in 1952, the reservoir has been completely filled in only two out of five seasons, namely 1953-54 and 1955-56.

According to the MKA Arghandab-Tarnak Area report of July 1956, 98,000 acres were under cultivation and being irrigated from Arghandab River in 1955. This required the release of 510,600 acre feet of water from storage, or about 5.22 acre feet per acre. The total area proposed to be irrigated in the Arghandab Valley is 184,060 acres. Assuming a requirement of 5 acre feet per acre per year, this area would require 920,300 acre feet of water. There were only three out of the eight years of record when the total river flow amounted to this much or more. In 1954-55 and also 1952-53, the flow was approximately 50 percent of the amount required. In 1947-48, it was 62 percent, in 1948-49, 95 percent, and 1951-52, 89 percent.

In the season 1953-54, when the maximum runoff of 1,358,000 acre feet occurred, the spill down the river in March, April and May amounted to 754,600 acre feet. Of this possibly half could have been used for irrigation, but the balance would be wasted. Consequently, the usable supply even in that season was only about 980,000 acre feet.

The North and Central Arghandab areas, containing 120,710 acres, have long been supplied with water from the Arghandab River through small ditch systems, and about 95,000 acres are being farmed this year. When the whole area is under irrigation, at the present application rate of 5 acre feet per year, an annual



Figure 1
Helmand River at Flood Stage



Figure 2
Arghandab River at Flood Stage Looking Upstream from New Bridge on Kandahar-Girishk Highway

supply of about 600,000 acre feet will be required. By reference to Table No. 2, it will be noted that all but three years in the last eight would have supplied this quantity. Shortages indicated for 1952-53 and 1954-55, amounting to 18 percent and 23 percent respectively, probably would not cause serious crop damage.

Supply for Tarnak Area

The addition of substantial new acreage, such as the Tarnak area of 63,350 acres, would create an acute water supply problem in a critical year, requiring either a substantial reduction of the amount used per acre or more storage to augment present supplies, or both.

It is possible that runoff records over a longer period of time will show more favorable results and may demonstrate the availability of water for further land development. It is also possible that a revision of present water-use practices and controls in the Arghandab area, which appear to be wasteful, could conserve enough water to permit partial or full development of the Tarnak area at some future time.

PROPOSED SURVEY OF ARGHANDAB AREA. The present financing of the MKA construction contract includes funds for a survey of water distribution and use in the Arghandab Valley. The survey was recommended on August 4, 1955 by a committee consisting of two engineers of the ICA staff, two engineers of the MKA staff, and the technical adviser to the Helmand Valley Authority (HVA). The proposed survey procedure was outlined in a letter from MKA to HVA dated March 11, 1956, but authorization to proceed has not yet been given.

The purpose of the survey is to secure the basic information upon which plans can be based for improving the efficiency of use of irrigation water in the Central and North Arghandab areas through allocation, measurement, control, conveyance, and management to allow for maximum utilization of available water.

The scope of the proposed survey, as stated in an MKA memorandum dated March 7, 1956, is as follows:

> "It is proposed that MKA will make field surveys and perform necessary office work to determine the water requirements and recommend allocations to the various areas. They will also investigate the layout of the present irrigation systems and determine the changes and additions needed to facilitate a program of water use and management which HVA proposes to initiate. In connection with the above investigations and surveys, MKA will delineate major drainage problem areas and the approximate alignment of major trunk outlet drains. Design drawings will be prepared for simple control structures which the people can build with locally available materials."

After completion of this survey and the putting into effect of necessary control measures by HVA, it should be possible to determine how much additional land can be placed under the irrigation system without jeopardizing the supply of water for the lands already irrigated. *It is strongly recommended that this survey be undertaken as soon as possible.*

Chapter III
SOILS AND AGRICULTURE

SOILS

The irrigable lands of southern Afghanistan and the waters of the Helmand River and its tributaries are among the principal resources of this rapidly progressing nation which is much in need of improving and stabilizing its economy and raising the living standards of its people. Although the construction of dams, canals, laterals and roads leads to a more effective use of these resources, an abundant water supply and the resulting cultivation of more land will intensify the ever-present problems of salinity, alkali, drainage and low fertility common to irrigated areas the world over. This chapter presents a brief summary of the soil and drainage characteristics of the project lands and some of the land reclamation problems which have been encountered, together with recommendations for improving the agriculture of the Valley.

General Characteristics of the Area

The Helmand and Arghandab Valleys are characterized by low rainfall, cool winters and hot summers, a long growing season, extremely flat topography, alluvial or old river terrace soils moderate to low in fertility and organic matter content, subsoils frequently underlain by impermeable conglomerate, and waterlogged areas adversely affected or out of production owing to salinity and alkali. Today these valleys have a serious weed problem, crop yields are generally low due to a lack of plant nutrients, soil structure is poor, and farming practices and tools are crude and antiquated.

Through the centuries, the Helmand River and its tributaries have frequently changed course, silting up old beds and cutting new channels. During floods these rivers carry millions of tons of silt from the highlands and spread it out over new and old lands, frequently bringing about the destruction of old crop lands and the creation of new lands suitable for cultivation. Numerous scattered areas of abandoned lands, old canals and ruins of villages and forts give mute evidence that other people in the earlier history of this ancient country have farmed these lands and failed, for one reason or another, and moved away.

Water Quality

The major irrigation waters are generally good to excellent. The total salt content of Helmand River water ranges from 200 to 250 parts per million (ppm) at Kajakai Dam to about 600 ppm at Chahar Burjak at the approach to the Chakhansur basin. The waters of the Arghandab River generally contain from 300 to 500 ppm of total salts at the reservoir and 600 to 700 ppm at its junction with the Helmand. The soluble sodium percentage of both these waters is low. Some



Figure 3
Ruins of Old Fort in Chakhansur Area



Figure 4
Orchard at Girishk. Old Fort in Background

ground waters collected in tunnels (karezes) are good, but others are extremely high in both total salts and sodium percentages, with consequent deleterious effects when applied to the soil.

The Helmand and Arghandab Valleys may have large ground water potentials in the deep and porous alluvial material underlying the top few feet of soil, but no suitable explorations have been made to determine availability of ground water for irrigation or for improving the domestic supplies of villages.

Topography

The general topography of most of the irrigable areas is extremely flat, with slopes ranging from 0.5% along the rivers to about 0.1% in the Nad-i-Ali and Marja areas and 0.025% in the Chakhansur. These flat gradients obviously intensify the silting problem in rivers and canals and make efficient irrigation and drainage difficult to attain. Locally, however, considerable leveling often is required.

General Description of Soils of the Valley

The soils of the Helmand and Arghandab Valleys are characteristically alluvial, being derived from mixed outwash materials from limestones, granites, feldspars, schists, and basalts well mixed with older gravelly outwash plains. The soils are generally underlain, at a depth of from two to five feet, by gravel or by mixed gravelly calcareous materials and, in many places, at slightly greater depths by impermeable silica- and lime-cemented conglomerate rock. Locally there occur extensive waterlogged and saline and alkali areas, frequently adjacent to or underlain by gypsum (calcium sulfate) beds. The more recent river terraces and bottom lands are commonly deep silt loams or very fine sandy loams over sandy or gravelly substratum, with conglomerate layers often at 6 to 12 feet or more in depth. The soils of the older river terraces or outwash plains are shallow to moderately deep fine or silt loams underlain by silts, sands and gravels in various combinations and at various depths. These, in turn, are usually underlain at depths of 5 to 9 feet by impermeable conglomerate from a few inches to many feet in thickness. Frequently interspersed among these irrigable soils are long narrow bands of gravelly and sandy non-irrigable materials, and occasionally there are bodies of fine-textured soils extremely difficult to drain.

Fertility

As judged by plant growth and crop yields, the soils of the Helmand Valley and its tributaries are moderate to low in fertility. Some laboratory tests have been made, but they have been inconclusive. Periodic additions of silt to the soil by flood waters tends to maintain a fair fertility status, particularly in regard to phosphate and potassium, and some nitrogen is supplied by symbiotic fixation during fallowing. The yields of most crops probably are limited principally by

the low nitrogen content of the soil. This results from (1) the use of most manure and crop residues for fuel and feed, (2) a high rate of organic matter decomposition due to the high soil temperatures, (3) the lack of crop rotations involving the periodic incorporation of a legume into the soil, and (4) over-irrigation and consequent loss of nitrogen and other nutrients through leaching.

Soil Structure

Because of plowing when the soil is fairly wet, the low organic matter content, the lack of crop rotations, the periodic deposition of silt, and the type of parent material, most of the soils of the Helmand Valley have poor structure. The soils are cloddy and crust easily. Native farm implements are crude and inadequate which results in poor seed beds and thus poor stands. With some crops, seedlings die due to inability to penetrate the hard soil crusts. Water penetration into the surface soil layers is generally good provided alkali is not present. Water movement is very good in gravelly subsoil layers.

Drainage

Owing to the flat topography, natural surface and subsurface drainage is only fair to poor. Canal seepage, surface wastes and excess irrigation waters cannot readily move into stream channels and wasteways and out of the area, even though the underlying coarser strata generally have good capacity to transmit ground water laterally. As a result, most of the ground water basins are presently filled or filling rapidly, and much of the land becomes waterlogged when repeatedly irrigated. Long-continued upward capillary movement of the ground water, which takes place when the land is not being irrigated, leads to concentration of salts in the surface soil and in the ground water and results in the formation of saline and alkali soils.

When salinity and alkalinity constitute a problem, excess irrigation water must be applied and thus the need for drainage is increased. The purpose of drainage is primarily to remove excess water from soil but, in irrigated regions, the removal of salt from soil may often be of greater benefit than the removal of water. Drainage, in addition to removing excess water and permitting the leaching of salt, leads to improvement in soil structure, increased depth of plant rooting, improved aeration, higher soil temperatures, improved organic matter decay and increased nitrogen fixation.

Salinity and Alkalinity

It is estimated that more than 35 percent of the irrigable lands of the Helmand Valley project are seriously affected by salinity and alkali conditions. Saline soils contain sufficient soluble salt to cause direct interference with the germination and growth of most crop plants. Alkali soils contain exchangeable sodium which also interferes seriously with the growth of most crop plants, but the effect is indirect by causing a breakdown in soil structure thus impeding

water penetration, air movement and seed-bed preparation. (Alkali soils also generally contain an excess of soluble salts.) Saline soils may be reclaimed simply by draining and leveling, and then leaching with an excess of irrigation water. To reduce the salt content by 80 percent requires about a foot of water per foot depth of soil. To effect a 90 percent reduction requires 1½ to 2 feet of water per foot depth of soil. The reclamation of alkali soils involves replacing the deleterious exchangeable sodium with beneficial calcium, usually by the addition of large quantities of gypsum, and the subsequent restoration of soil structure, in addition to leveling, draining, and copious leaching. Hence, it can be seen that, whereas reclamation techniques are relatively simple, they may be time-consuming and expensive, particularly in the case of alkali soils where both drainage and an expensive amendment such as gypsum must be provided. Farmers in some places in the Valley have effectively leached soils free of excess soluble salts, but little, if any, reclamation of alkali soils has been attempted. It is doubtful, in view of the small size of farm holdings and the economic status of the farmers, whether alkali reclamation can be carried on by individuals.

Over the centuries much of the irrigable land in the Valley has been subject to increasing accumulations of salts and alkali and has eventually been abandoned. Some of the saline land, however, has been reclaimed, wholly or partially, through very slow natural processes or more rapidly through the efforts of farmers, who have long known that salty soils are benefited by leaching. Their method, provided both water and time were available, was to construct borders surrounding small basins and then leach them free of surface accumulations of salt. As to the alkali land, which comprises hundreds of thousands of acres scattered throughout southern Afghanistan, there is no evidence that reclamation of such lands has ever been successful. If leaching alone did not suffice, the land apparently was abandoned.

Land Classification

Land classification schemes generally are based upon agronomic and economic considerations and are used primarily for economic purposes. While differences in physical and chemical characteristics distinguish the various land classes, the mapping characteristics which express these differences, if they are to be useful, must be developed on the basis of economic factors. The basic factors considered usually include costs of land development, productive capacity, and costs of production. These factors, including their agronomic aspects, must be considered in determining the suitability of land for irrigation regardless of whether for new development, supplemental water, or rehabilitation and betterment programs. The specific physical and chemical field-mapping criteria which should be included are soil depth, water-holding capacity, fertility, permeability, leachability, salinity, alkali, slope and leveling requirements, and drainage needs.

In the Helmand Valley, land classifications have been made to determine the extent and suitability of soils for development, reclamation and subsequent

production which would accrue upon their development have not been realized and, in the light of present knowledge, appear to have been overly optimistic. Likewise, estimates of production which are presently being used to determine economic feasibility of projects take for granted a high degree of farming skill and efficiency which Afghan farmers do not now possess and are not likely to attain in the foreseeable future. (Chapter III)

5. NAD-I-ALI AND MARJA LANDS. Two previously unfarmed areas lying on old river terraces above the Helmand River, known as the Nad-i-Ali and Marja areas, have been developed for subdivision into small farms on which new settlers have been or will be placed in the near future. The soils of these particular areas are less fertile and contain a higher proportion of low class lands than the river bottom lands and require very extensive leaching and drainage. These poor quality soils are not well adapted to the growing of small grains or other cash crops which must be planted annually. (Chapter III)

6. FARMING METHODS. Farming methods are primitive due primarily to lack of equipment and incentives. Probably because of past shortages of irrigation water, the tendency has been to over-irrigate when adequate supplies become available. The necessity of drainage and soil reclamation has not been recognized in the past and very little work of this kind has been done by farmers or local communities. The value of leaching saline soils is beginning to be recognized but is actually practiced only in a small way. (Chapter III)

7. CROPS. Wheat is the principal crop but alfalfa, cotton, corn, and field beans and a wide variety of excellent fruits and vegetables are also grown. Production rates have been low, primarily because of irregular water supplies and scarcity of fertilizer materials. (Chapter III)

8. PEOPLE. The people of the Valley are fully capable of achieving better land utilization, increased crop production and higher living standards. Acceptance of new ideas will be slow and must have the support of officials and village leaders. Educational levels are low, but the people are receptive and, in many cases, warmly desirous of constructive advice. (Chapter VII)

9. INDUSTRY. Industrial development at present is very limited. There is considerable potential for expansion of organized industry in the larger communities and of handicraft throughout the area, especially to exploit the existing and potential agricultural resources of the Valley. Private capital appears to be available, but technical advice and assistance will be needed to realize this potential. Factory industry also needs electric power, managerial talent, and suitable fuel. There is a growing demand for electric power, which cannot be met with present limited facilities and additional demand will be created by new power users such as the international airport at Kandahar now under construction. (Chapter VIII)

10. ROADS. Improved communications between the Helmand Valley and

sustained cropping. Suitability in this case should connote permanency (i.e., sustained yield), correlation of potential productive capacity after reclamation with anticipated costs of reclamation and drainage, ability of farmers to reclaim and to operate effectively including the payment of operation and maintenance costs. In addition, as regards people, land and markets, adaptability for producing a wide range of crops is essential. Appropriate emphasis must also be given to proper land use, size of farm unit, repayment ability, costs and benefits, and the establishment of assessments. The most important phase of the land appraisal is to separate, according to suitability, those lands which (with due consideration to available resources, time and technical know-how) can be reclaimed economically as distinguished from the inferior lands for which the total costs of reclamation would exceed the benefits.

Although the description of the land classification standards used in the Helmand Valley obstensibly recognize these factors, the Survey Team's inspection of the soils of the Helmand Valley and its consideration of the social problems, available resources, the reclamation and drainage accomplishments to date, and the attainable crop yields in the Valley have led to the conclusion that these standards, particularly as regards "good irrigation farming methods", amounts of fertilizer available, and relative cost and feasibility of reclamation and drainage, have not been adhered to very closely.

According to Volume II Technical Handbook, Land Development Department of MKA dated August 21, 1954, lands in the Helmand Valley are classified in accordance with the following standards.

LAND CLASSIFICATION STANDARDS

CLASS I: Land which is suitable for irrigation of all climatically adapted crops with no restrictions in use other than good irrigation farming practices. Such practices include the use of good rotations with soil-building crops. The use of moderate amounts of manures and commercial fertilizers may be required for high yields but fair to good yields can be maintained for a long period of time with minimum fertility management. Routine smoothing and floating for seed bed preparation and irrigation is a regular practice. Only simple surface drainage coupled with proper use of water should be necessary to maintain the soil in a well-drained condition. Surface soils should be easily tilled with no special treatment necessary to control crusting, salts or alkali. The soils are deep and roots, air and water penetrate readily; yet the water holding capacity is good. Topographic conditions are such that land development is relatively easy.

CLASS II: Land which is suitable for irrigation of a majority of the climatically adapted crops but requires one more easily applied practice in addition to good irrigation farming methods to maintain productivity. Generally Class II lands will be less productive, be adapted to a narrower range of crops, be more expensive to develop, or be more costly to farm than Class I lands. Special practices which may be required include: (1) Land leveling, (2) Wind or water ero-

sion control, (3) Special irrigation development such as bench leveling, and irrigation methods such as contour irrigation and restricted water use, (4) Special tillage operations to correct surface crusting on hard pan layers, (5) Removal of rocks, trees, or other debris, (6) Correction of low fertility by special application of fertilizers or soil amendments, and (7) Minor improvement of surface and subsoil drainage and removal of salts where such improvements are easily accomplished and will result in higher sustained yields. If temporary limitations such as stoniness or need for leveling can be removed and do not recur these lands may be reclassified as Class I.

CLASS III: Land which is suitable for irrigation of a limited number of climatically adapted crops but requires special treatment to overcome major deficiencies and maintain yields. Generally these are lands of marginal and restricted suitability requiring careful management for even fair to good yields of adapted crops. Major drainage measures such as deep open ditches and tile drains may be needed. Reclamation practices to control salinity and alkalinity may be required. Other measures may include extensive leveling of uneven topography or terracing and contour irrigation of steep slopes. Some soils of this class have such low water holding capacity and high permeability that irrigation must be frequent and with high heads and short runs. Soils with low fertility requiring continuous use of large quantities of fertilizers will be placed in this class. Class III includes some lands subject to annual damaging overflows but otherwise productive. Economic justification of development of Class III lands must carefully weigh costs of development and farming costs against net returns which will commonly be low from these lands.

CLASS IV: Land which is not suitable for continuous irrigation of common tilled crops but has limited use for these crops. It can be irrigated safely and with fair to good yields when in vegetation such as trees for woodland products or grasses and legumes for hay or pasture. Such lands may be too shallow, too steep, too frequently overflowed or too wet, saline or alkaline for practical and economic development as cropland. Under special situations, such as easily available water supplies, irrigation to produce trees for fuel or forage for livestock may be justified.

CLASS V: Land which is unsuited for irrigation of crops. Such lands include steep or broken areas, mountains, river wash, stream beds, extremely rocky or gravelly soils, sand dunes, marshes, and salt or alkali flats not practical to reclaim.

DRAINAGE FACTOR IN LAND CLASSIFICATION. The land classification standards used in the Helmand Valley undoubtedly were intended to reflect productive capacity as against cost of production. However, many of the costs to be assumed by the individual farmer in preparing the land for adequate crop production are not known and have not been included in any economic analyses heretofore made. This has resulted in gross inequalities in land assignments to settlers.

Some farmers are assigned good land capable of sustained crop production with simple and relatively inexpensive development problems, such as leaching to remove salt accumulations; whereas others are assigned much poorer land, perhaps anticipated to have the same ultimate productive capacity when developed, but not capable of sustained production now owing to problems that are too complex and expensive to be solved with limited resources. Among such problems common to the Helmand Valley are alkali reclamation and farm drainage.

Description of Project Areas

A brief description of each of the authorized project areas follows:

NAD-I-ALI. This project comprises 18,500 potential net irrigable acres. It was settled in 1951 and the first crops were harvested in 1952. Approximately 84 percent of the potentially net irrigable acreage is Class IV land. About 2 percent is Class II and 14 percent Class III. The project is located on an old river terrace, with land slopes ranging from 0.120 to 0.075 percent. The soils are shallow over permeable gravels. The gravels are underlain successively by a few inches to a foot or two of slowly permeable conglomerate a few inches to several feet in thickness. Interspersed in the irrigable soils and intercepting many of the canals, laterals and farm ditches, are numerous highly permeable sand and gravel ridges which are often underlain by gypsum deposits. In addition to being shallow, these soils have a low water-holding capacity and, therefore, require frequent irrigation. Despite the construction of 80 miles of tile and open drains, extremely serious waterlogging and salinity problems have occurred as the combined result of canal seepage, flat gradients, frequent irrigations, low heads, and poor water management. Each year since the first crop, average wheat yields have decreased, presumably due to salinity and decreasing soil fertility, and each year more land has gone completely out of production. Also with the advent of irrigation, weeds have become a serious problem.

MARJA. The Marja project is a new and as yet unsettled area containing 27,190 potential net irrigable acres of which 30 percent is Class II, 28 percent Class III and 42 percent Class IV land. The lands are on an old river terrace with an average slope of 0.10 percent. Some of the soils are moderately deep, but most are shallow silt loams and sandy loams, lying over slowly permeable soil material which is underlain by impermeable conglomerate. Loose sands and gravels occur in and near the northeast and the southwest part of the project. These soils are only moderately fertile, and a large proportion of them are saline even before irrigation. The subsoils of the Marja are similar to those of the Nad-i-Ali. Hence, equally difficult problems of canal and ditch leakage, irrigation water management, waterlogging and salinity will arise when these lands are put under cultivation. In addition, wind erosion control is required. On portions of the Marja area, soil and salinity conditions are similar to those described above for the Nad-i-Ali tract and, in some locations drainage costs will prove to be uneconomic.

SHAMALAN. This project is located on a recent river flood plain, or alluvial bench, and contains 42,325 potential net irrigable acres. The soils are dominantly silts and very fine sandy loams, with stratified silty and sandy deposits indicating past changes in the location of the river channel. Sand dunes are encroaching on the lands in the central and southern sections and some soils are quite erosive. The depth to permeable sands and gravels is variable and, where they are deep, irrigation has resulted in waterlogging, the accumulation of soluble salts and alkali, and in the subsequent abandonment of some of the land. Recent increased irrigation has led to rising water tables over much of the area. Closely spaced farm drains will be required to lower the water table in the many areas containing deep silts, and soil amendments in addition to leaching will be required for the reclamation of some areas. The organic matter content of these soils is fair, and fertility ranges from poor to good. Soil classification indicates that 32 percent of the land is Class I, 51 percent Class II, 13 percent Class III and only 4 percent Class IV.

DARWESHAN. The important soils of this project are located on a long silty bench flanked on both sides by lower river benches containing a limited amount of good irrigable land. About 50,773 acres are considered potentially irrigable, of which about 16 percent is in Class I, 34 percent in Class II, 49 percent in Class III and 1 percent in Class IV. The soils are chiefly deep silt loams and silty clay loams with some sandy bottom lands and considerable saline and alkali areas. The soils are underlain by sand, coarse gravel and conglomerate rock at depths of 5 to 15 or 20 feet. High water tables exist in only a portion of the irrigable lands at present, but the drainage problem is becoming more serious as more water is being applied to the land. Extensive waterlogged areas now exist, and the water table is now above the conglomerate layer in many places. Closely spaced and expensive drains will be required in the development program.

SERAJ. This project consists of a total of about 63,000 potential net irrigable acres located in five widely separated tracts of land extending about 70 miles along the east side of the Helmand River. Two of these tracts, one on the Helmand River across from Girishk (7,500 acres) and the other north of the Arghandab River and southeast of Lashkar Gah (18,600 acres), are mostly recent river valley soils. They are deep silt loams and silty clay loams, but a third or more are waterlogged and affected by salinity and alkali. The remaining three tracts, about 36,900 acres in all, are located on old river terraces and consist chiefly of shallow to medium depth silt loams and sandy loams, over shallow impervious beds of conglomerate or shale. Serious water-table and saline and alkali problems exist. Some of these tracts were settled as recently as 1927 and already thousands of acres have been abandoned although much of the project does not yet have a firm water supply. Four percent of the soils are in Class I, 17 percent in Class II, 27 percent in Class III, and 52 percent in Class IV. Production is low due to salinity, alkali, high water tables and low fertility.

NORTH ARGHANDAB. This project area contains 40,235 potential net irrigable acres on the north side of the Arghandab River. This land has been classified as 50 percent Class I, 2 percent Class II, 39 percent Class III, and 9 percent Class IV. It is chiefly composed of deep silt loams and silty clay loams on sloping valley fills and along the margins of old river terraces. Moderately deep to shallow silt loams over moderately deep gravel and conglomerate rock lie along the upper part of the area adjoining the desert. Highly saline and alkali soils and waterlogged areas are found in a number of places, due primarily to a lack of drainage facilities. The soils are moderately fertile and production is fair to good. About 26,800 acres are farmed regularly, and the remainder lacks a water supply or is abandoned because of saline-alkali or high water-table conditions.

CENTRAL ARGHANDAB. About 80,475 acres have been selected for ultimate improvement or development of which 32 percent is in Class I, 21 percent in Class II, 47 percent in Class III, and none in Class IV. The soils are mostly deep silt loams and silty clay loams on recent and fairly recent river terraces. However, there are some shallow to moderately deep soils on older river terraces in the upper end, some fine-textured soils difficult to drain in the south-central portion of the area, and severe salinity, alkali, and waterlogged conditions in the southern part of the area. Most of the upper end and the portions along the river are now being farmed to fruit and truck crops, and wheat is the principal crop in the lower areas. Production is poor to good varying with fertility, water supply, salinity, alkali and water-table levels.

TARNAK. This area, on the basis of preliminary estimates, is said to contain 90,000 potential net irrigable acres, of which only 63,350 have been selected by the project engineers for eventual development. The lands are primarily deep silt loams and silty clay loams in a fairly recent river terrace, with some sandier soils along river bottoms, and moderately deep to shallow loams and sandy loams over desert outwash in the northeasterly end. There are numerous wet areas, one large fine-textured slowly drainable area, and numerous fairly large severely-affected saline-alkali areas. The lands selected for development are potentially: Class I, 11 percent, Class II, 39 percent, and Class III, 50 percent. These soils appear to be moderately fertile. Production is uncertain, depending on availability of water.

KAJAKAI-SHAMALAN. This area, containing about 45,500 acres, lies along the westerly side of the Helmand River and is here taken to include 9,000 acres of "out-of-project" land now being irrigated in the vicinity of the Nad-i-Ali and Marja areas. No plans have been formulated for irrigation improvements on any of these lands. A total of about 36,500 acres is now being irrigated using the regulated supply in the river.

GARMSEL. The soils of this area have not been as carefully investigated as those of the Upper Helmand Valley. About 43,475 acres apparently are potentially irrigable, and approximately 12 percent are in Class I, 32 percent in Class

II, 42 percent in Class III, and 14 percent in Class IV. The area consists of small bodies of recent alluvial terrace and river flood plain soils, separated from one another by river meanders, old channels, and drifting sand dunes. The soils are mostly sandy loams and loams over river gravels and sands. The surface of most of the area is hummocky, and much of the land is now saline or has a high water table, or both. Most of the land is subject to annual flooding. Production is low and uncertain, and only a small percentage of the land is under annual cultivation. No plans have yet been made for this area, and it is outside the scope of the present survey.

CHAKHANSUR. Figures on potential net irrigable acres in the Chakhansur have been revised downward a number of times and now stand at 65,000 acres, although preliminary reconnaissance suggests that 250,000 acres may eventually be reclaimed. Land classes have not yet been assigned, but the soils range widely from very sandy river bottom or river terrace soils to heavy saline-alkali soils, only three to six feet above lake basin clays and shales. Salty and alkali areas are extensive, the surface is very irregular, and sand dunes are in active movement over much of the area. Drainage is only fair on about half the area even though the tilled lands are shifted about each year as floods, high water tables, and salts continually restrict production. Yields are very low, and have decreased markedly since a survey made in 1903-05. Very preliminary studies have been made for development of this area. The area is outside the scope of the present survey.

Recommendations on Treatment of Soils

FARM DRAINAGE. Afghan farmers recognize the problems that arise from inadequate drainage, but it is not certain that they have attempted to do anything about it in the past. Better irrigation methods, particularly less excessive irrigation, would help considerably. Lately, a few progressive village chieftains have had a few drains constructed by hand to a depth of 3-½ or 4 feet. These have lowered the water table somewhat and enabled the farmers to leach excessive salt accumulations out of the soil, with consequent significant increases in crop yield. The practice of digging drains by hand is not spreading rapidly, however, because of the great amount of work required. *Nevertheless, such work should be encouraged.*

TILE AND OPEN DRAINS. Both tile and open drains have been constructed in the Nad-i-Ali project, but they were not spaced closely enough to be effective. Differences of opinion exist among people associated with the Helmand Valley project regarding the relative merits of open-ditch and tile drains. Open-ditch drains waste considerable land, require frequent laborious or costly cleaning, are subject to erosion, harbor and distribute noxious weeds, and act as a barrier to the movement of farm implements and animals. They are advantageous on some low-cost lands where it is not feasible to eradicate plants whose roots tend to clog tile drains. Tile drains, on the other hand, are relatively permanent, do not waste land and require little upkeep. Installation costs are higher and certain plants,

like camel thorn and willow, must not be allowed to grow in their vicinity. However, prevention of clogging is less costly than ditch cleaning. *Construction of tile drains is recommended on good quality land where drainage is needed.*

DRAIN INVESTIGATION. Preliminary investigations indicate that the costs of complete drainage may be very high in many areas owing to the need for close spacing of drains. Plans have been made to confirm or disprove these predictions by field determinations of drainage requirements on two different types of problem land in the Marja project. This investigation will involve constructing identical networks of both tile and open drains at various spacings and depths and correlating predicted and actual required spacings and costs. *It is recommended that this investigation be initiated immediately as planned and the results be used to determine the desirability of similar investigations in other types of problem areas.*

INSTALLATION OF DRAINS BY FARMERS. It is believed that the farmers in most cases can construct necessary drains by hand, although the work may have to be spread over a considerable period. If the required spacing averages 100 meters, an adequate depth is 1.5 meters, and a straight-walled ditch 0.7 meters wide can be maintained, a 15-acre farm would require 600 lineal meters of drain and the excavation of about 600 cubic meters of soil. Two to three cubic meters can be excavated by a man in a 10-hour day provided no conglomerate is encountered. At three cubic meters per day, this ditch work would require at least 200 man-days or nearly 8 months of work for one man. The work might be done in spare time within two or three years, or sooner if more than one worker were available in the family. The same amount of effort would install closed drains instead of open drains, if the drain tile were available. *It is, therefore, recommended that HVA assist in the construction of necessary farm drains by furnishing clay or cement tile or by giving some help with the trenching operation where needed.*

SALT AND ALKALI REMOVAL. Although the methods and benefits of leaching salt accumulations from soils are widely known and are practiced in the Helmand Valley where water and drainage facilities are available, the farmers have no way of determining when an adequate amount of leaching has been done. *Agricultural extension workers should be trained to make simple, quick tests of salinity in soil samples and provide this valuable information to farmers.*

Some of the Helmand Valley soils, particularly those on the Nad-i-Ali and on the experimental farm near Lashkar Gah, are high in boron, a soluble salt that is relatively more difficult to leach out than sodium salts. A concentration of a few parts per million of boron seriously decreases the growth of many crops, particularly small grains. It is difficult to differentiate between boron toxicity and the effect of an excess of ordinary soluble salt. *Hence, it is recommended that both soluble salt and boron determinations be made where crop growth is poor subsequent to leaching.*

Thousands of acres of alkali soils in the Helmand Valley have been classified as irrigable. Their reclamation can be accomplished by adding a chemical amendment, usually gypsum, leaching thoroughly, and then restoring soil structure by alternate wetting and drying and by the planting of suitable crops. The process is simple but time-consuming and expensive. Chemical tests can be made to estimate the amount of amendment required.

It is not known whether alkali reclamation has ever been attempted by Afghan farmers. The only known worthwhile field experiment in Afghanistan was conducted by MKA on a moderately severe alkali soil in the Tarnak area. Costs are not available, but partial reclamation required the addition of 30 to 45 tons per acre of gypsiferous material (10 to 15 tons per acre of pure gypsum) followed by leaching with six to eight feet of water. Such a program is obviously beyond the abilities and resources of most settlers. *Hence, it is recommended: (a) that no farmers be settled on alkali soils, (b) that experiments be carried out to determine the cost of reclamation of alkali soils, and (c) that the experimental results, when obtained, be used in assessing the classification and feasibility of reclamation of alkali soils.*

CONVERSION OF NAD-I-ALI AND MARJA LANDS TO IRRIGATED PASTURE AND HAY. The low quality of the Nad-i-Ali and Marja soils and the excessive waterlogging and salinity caused by the structure of these bench lands, create an almost insurmountable problem of reclamation. The continued cultivation of the Class IV lands in these areas appears doomed to failure as far as annual cropping is concerned. A radical change in land utilization appears to be the only solution of this problem.

It is recommended that the Class IV lands, comprising 84 percent of the Nad-i-Ali project and 42 percent of the Marja project, be converted to irrigated pasture and hay, and utilized for the raising of sheep and possibly other livestock. It is believed that development of permanent pasture would not require much additional drainage and that necessary drains could be constructed by the farm owners. Many varieties of forage crops would thrive under the present condition of high water table and would increase the fertility of the soil. The returns from a livestock economy should greatly exceed that obtainable from irrigated crops.

The fortuitous circumstance that the nomad settlers in the Nad-i-Ali have traditionally been sheepherders should permit an easy transition from crop farming to livestock production. If the bands of sheep belonging to owners related by blood are herded together, as is to be expected from tribal custom, many men would be unoccupied for most of the year. Their employment in other work such as handicrafts or local cottage industries should be planned in advance with their cooperation to assist them in making the change from their present farm work.

On the Nad-i-Ali project, about 15,500 acres of Class IV or poor land should be converted to irrigated pasture and hay over a period of from two to three years.

About 1,000 livestock farms of 15 acres each, carrying 48 sheep and 1 cow, could be established. To put these farms into operation the following capital outlay would be required:

46 ewes @ 400 afghanis	18,400 Afs.
2 rams @ 800 afghanis	1,600 Afs.
1 cow	2,000 Afs.
Seed and seeding	4,000 Afs.
Subsidy of family during the first year	6,000 Afs.
Total Cost	32,000 Afs.

Stocking and seeding 1,000 farms at a cost of 32,000 afghanis would amount to a total of 32,000,000 afghanis or approximately $1.5 million at the exchange rate of 21.26 afghanis per dollar.

On the Marja project, about 11,500 acres of the low class land should be devoted to irrigated pasture and hay. This will require the expenditure of funds for livestock and grass seed as estimated above for Nad-i-Ali. The cost of subsidizing the new farm families on the Marja project can be avoided, if the land is prepared and the livestock purchased before arrival of the new settlers. The estimated cost of introducing a livestock economy on 750 farms in the Marja project, based on 24,000 afghanis or $1,125 per farm, is $850,000. This sum has not been included in later estimates of total expenditures for immediate overall project development for the reason that it will be offset, at least in part, by savings in drainage and land preparation work.

CROPS

Present Crops and Crop Yields

Few accurate statistics are available on farmed acreages and crop yields in the Helmand Valley area. The figures which follow were necessarily estimated from observation, from the differing results obtained by Afghan workers in making economic surveys, and from conflicting estimates furnished by a number of Afghan and foreign agriculturists working in the Valley.

Most of the 50 to 65 percent of irrigable land in cultivation each year is in wheat, as much as nine-tenths of it in some areas and as little as one-half in the fruit-producing areas of the Arghandab. Significant amounts of corn, cotton, vegetables, melons, and alfalfa are widely grown in numerous small acreages. Here and there are patches of sorghum, rice, pasture, beans, potatoes, tobacco, and wood for lumber and fuel.

Because of the scarcity of wood to build supporting frames, grapevines are planted in the bottom of trenches and trained up on high earth ridges between the rows. The ridges support the vines and fruit, act as a windbreak, and provide a place to dispose of the accumulations of silt desposited by irrigation. Under this

system only about 400 to 500 vines can be accommodated on an acre of land, and yields per acre are correspondingly low.

Specialty crops, such as fiber, oil seed, sugar beets, and others have been tried in an experimental way, but economic feasibility has not been demonstrated.

The following are estimates of present average yields per acre for the principal crop groups:

YIELDS PER ACRE

Crop	Land Class			
	I	II	III	IV
Wheat	10 bu.	8 bu.	6 bu.	4 bu.
Corn	15 bu.	11 bu.	7 bu.	4 bu.
Seed Cotton	800 lbs.	600 lbs.	300 lbs.	200 lbs.
Vegetables	4,000 lbs.	3,000 lbs.	2,000 lbs.	1,000 lbs.
Tree Fruits	3,000 lbs.	2,000 lbs.	750 lbs.	500 lbs.
Grapes	5 ton	4 ton	2 ton	1 ton
Alfalfa	3 ton	2 ton	1 ton	0.1 ton

Recommendations for Crop Experiments

FRUIT TREES. Occasional below freezing temperatures apparently preclude the growth of desirable and remunerative tree crops such as dates, figs, olives, and citrus in the Helmand Valley. *The UN Food and Agriculture Organization (UN-FAO) should be consulted on the possibility of locating and obtaining varieties that might be tested in the Valley for cold tolerance.*

COMMERCIAL CROPS. *Other speciality crops should be tested for adaptability and industrial potential.* Among these are canaigre for tanning; tobacco and pyrethrum for pesticides; ramie, flax and hemp for fibre; and sunflower, sesame, safflower, flax, castor bean, and cotton seed for oil. This program should be in the HVA agronomy department with technical assistance from ICA.

It has been demonstrated that a number of new and desirable crops for industry and home consumption can be grown in the Helmand Valley, but a demand must be created for them. These include sugar beets, barley, oats, flax, sweet potatoes, peanuts, sorghum, and many new vegetables. *It is recommended that HVA consult with ICA and UN-FAO on means to create incentives for growing any or all of these crops.*

PASTURE GRASSES. In addition to the Nad-i-Ali area and parts of the Marja area, there are poorly drained lands elsewhere in the Valley which have a low potential crop productive capacity and will be found expensive to drain. On such lands, a livestock pasture economy is very likely to develop, particularly in view of the fact that many of the settlers will be former herdsmen. In anticipation of such a possible development and to assist in the Nad-i-Ali and Marja conversion, *it is recommended that HVA and the ICA establish trials to determine good pasture*

other parts of Afghanistan are essential to Valley development and the spreading of its benefits of all types throughout Afghanistan. In particular, the improvement of the road between Kandahar and Kabul is believed to be of economic as well as social importance. (Chapter VIII)

11. HVA. The Helmand Valley Authority (HVA), an agency of the Afghan Government, has undertaken the tremendous problem of preparing, settling, and administering large areas of new land supplied with water under the construction program. The necessary work includes land leveling, small ditch construction, procedures for the settlement of new people on project land, construction of villages and public buildings, general education, training in agriculture and public health, and the operation and maintenance of reservoirs and distribution canals. The HVA is basically well conceived and its top management enthusiastic and competent. However, it has not been able to delegate authority adequately, is seriously understaffed and desperately in need of additional trained personnel and assistance in establishing an effective organization. To the extent possible under the terms of its authorization, HVA should be vested with more local autonomy. (Chapter V)

Land development work is in the hands of a branch of HVA, called the Afghan Construction Unit (ACU), which was organized in 1954. Little progress has been made to date because of delays in receiving needed grading and ditching equipment. Under the work program as outlined in the third MKA contract, the primary irrigation and construction work is proceeding at a much faster pace than the corresponding land development work for which ACU is responsible. Thus, as the gap between construction and development widens, it becomes apparent, unless steps are taken to re-program the work in order to close the gap, that the interval of time between MKA construction and ACU completion might be as long as four years. (Chapter IV)

The operation and maintenance division of the HVA has fallen behind in maintenance of canals and structures but, with the addition of some personnel and on receipt of new equipment to be furnished by ICA, this work should soon be brought to a current basis. (Chapter VI)

12. FAMILY LAND ALLOTMENTS. The present HVA land settlement policy for "new land" in the Helmand Valley proposes to allocate lands to families in amounts ranging from 7-½ acres of the best land (Class I) to 15 acres of the poorest land (Class IV) per family. In view of the sustenance requirements of a family, the acreage proposed per family is inadequate to permit more than bare subsistence farming, with little or no chance that payments can be made to defray costs of operation and maintenance or retirement of debt. This is particularly true with respect to the lands of poor quality. (Chapter VII)

13. ICA. The International Cooperation Administration (ICA) has given valuable technical advice, has trained Afghan personnel and has furnished various forms of assistance in implementing the development work of the Helmand Valley

mixes for planting, experimenting with alfalfa, hubam, sweet clovers, Persian clover, berseem, birdsfoot trefoil, Dallas grass, crested wheat, Rhodes, Bermuda, Sudan, orchard, and rye grass.

SALT TOLERANT CROPS. The salt-tolerance of all kinds of crops is being continually tested at the U. S. Salinity Laboratory, Riverside, California, by trained personnel with extensive facilities under climatic and soil conditions similar to those of the Helmand Valley. *It is, therefore, recommended that salt-tolerance trials in the Valley be abandoned and any required information be obtained from the Riverside institution.*

PLANTING DATES AND PLANT SPACING. *As new crops and crop varieties are introduced, careful tests should be made of planting dates and the information passed on to the farmers.*

Native plants, except for trees, are relatively widely spaced. This has developed from centuries of low fertility and frequent shortages of irrigation water. Increased water supplies might immediately permit closer plant spacing and increased yields in many areas. As fertilizer materials become more abundant, large increases in plant population and resulting yield will be possible. *The Agricultural Extension Service should have a continuing plant-spacing program in anticipation of needs.*

Fruit trees are generally planted too closely and are seldom, if ever, pruned. Large increases in fruit production would result from thinning and pruning, but exact requirements are not known at present. *An investigation should be undertaken by a horticulturist on the HVA staff to determine the best methods of tree culture.*

FARMING TECHNIQUES

Cultivation and Harvesting

Present farming techniques throughout the Valley are crude and antiquated. The farmer is generally a hard-working individual, strongly influenced by precedent and not easily induced to alter methods of cultivation which have been practiced for centuries, if not, millennia. He is able under present conditions to do little more than feed and clothe himself and his family.

Planting operations are begun by irrigating the land to soften it for plowing. The plow is generally an iron-pointed stick that only scratches three or four inches of the top soil. It is pulled by slow-moving oxen. The farmer then levels the land by dragging a log back and forth across it and sometimes breaks up the large clods with a wooden mallet.

Seedbed preparation is generally poor, causing relatively poor germination. The seed is carried in a sack or the long shirt tail of the farmer and broadcast by hand. Wheat, corn, and cotton are sown in this manner, after which the seed is rather inadequately covered by plowing or dragging. Frequently, there is not enough moisture in the soil for germination, in which case the field is again irri-



Figure 5
Typical Plowing Scene

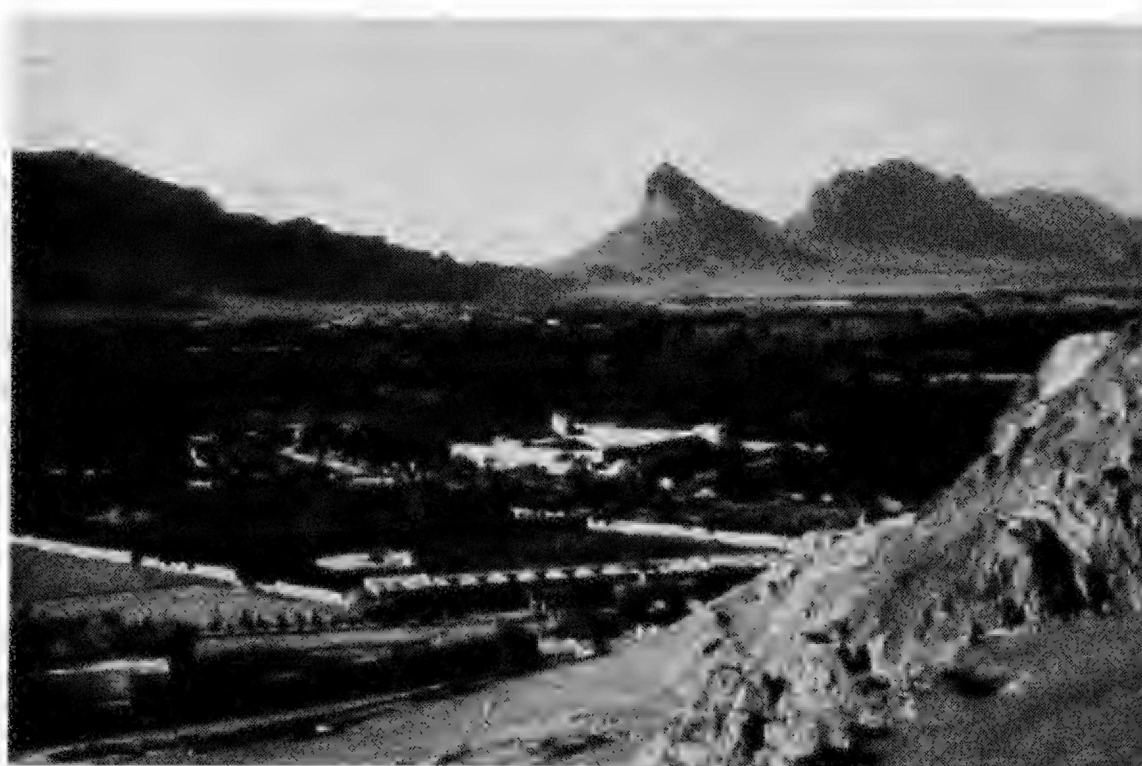


Figure 6
Northerly Portion of Arghandab Area
Looking Easterly Toward Kandahar

gated. The only crops planted in rows are some vegetables and melons, which are grown on ridges. In the Nad-i-Ali area, ICA-trained extension workers are now urging row-planting in introducing new varieties of corn and cotton seed. This method was observed in the Helmand Valley 50 years ago and was later abandoned for reasons which have not been ascertained.

Little or no cultivation is done after the seedlings emerge. Weeds, if disturbed at all, are sometimes pulled out by hand or more commonly cut off at the ground surface with a small hand sickle and used for fuel or feed. Occasionally, the soil is loosened, principally in gardens. All hand labor on the soil is done with a light shovel.

Crops are harvested with a short saw-tooth sickle of which the model is the flint sickle of neolithic peoples living 12,000 years ago. Grain is threshed under the hoofs of animals pulling a drag over the grain heads and winnowed by tossing the grain and straw into the wind. This process alone takes about a month, weather permitting. The flour is ground between stone querns, turned laboriously by women, or between the large water-driven stone wheels in the village mills.

Alfalfa, and similar periodically harvested legumes and grasses, are generally cut so close to the ground, with hand sickles, that growth recovery is slow, especially in the spring. Crop production could be increased significantly simply by cutting these crops 1-½ to 2 inches above the ground. This can be easily shown in demonstration plots by extension workers.

Irrigation Practices

Crops are irrigated on a schedule dictated by water availability, distance from the head of the ditch, and perhaps partly by crop requirements. Irrigation water is distributed by means of small, low-head ditches, often miles in length, to small level basins or kurds, seldom more than half an acre in area. From 2 to 6 inches of water is applied at each irrigation and almost all of it has to percolate downward through the soil. Wheat may receive from one to four or five irrigations, corn or mellons seven to twelve, and other crops intermediate numbers of applications. Opinions differ, but it is likely that most crops in the Helmand Valley are irrigated excessively when water is available with consequent losses in fertility and hence in crop yields. In fact, many farmers over-irrigate regularly in fear of a possible later water shortage. The resulting excessive percolation, in the absence of adequate drainage facilities, usually raises the water table with consequent salt accumulation and further decrease in the crop yield.

Irrigation water management is one of the most important and least appreciated fields in agriculture. It involves the conservation of water in areas of short supply, such as the Arghandab, the reduction of nutrient losses by avoiding excessive leaching, the prevention of a buildup of the water table caused by excessive percolation into the subsoil, and the maintenance of a good supply of readily available moisture in the soil. Good water management involves leveling

the land, measuring the water, selecting proper water application methods, and determining when to irrigate.

It is recommended that the ICA recruit an irrigation specialist to work on the problems of management and leaching, and to train agricultural extension workers in good irrigation practices.

Fertilizing

Owing to inherently low fertility, most of the Helmand Valley soils cannot continuously produce adequate yields without some annual provision for restoring the plant nutrients removed by cropping. Animal manures, ashes, and "night soil" are available to fertilize for summer crops on about 5 to 15 percent of the land annually, the percentage depending upon location. In general, it is necessary to allow about a third of the land to lie fallow each year to enable the fertility of the soil to be restored, and particularly the nitrogen level to be brought back, through symbiotic fixation.

USE OF LEGUMES. Most rotations involve simply cropping and fallowing in alternate years. In the more fertile valleys near Kabul, annual legumes are included in rotations on 15 to 20 percent of the land, which is then used for summer crops. The remaining land is fallowed alternately with wheat. In other areas, legumes are included in about 5 percent of the acreage. Farmers in the Helmand Valley seldom grow legumes for incorporation in the soil, because (1) many are not convinced that green manuring for one year is sufficiently superior to fallowing to be worth the effort, (2) owing to low soil fertility many cannot grow an adequate legume crop immediately following a food crop, (3) implements and power able to incorporate green manure into the soil satisfactorily are not available, and (4) the farmer is often too busy threshing or putting in wheat to plant legumes. *The HVA should investigate the desirability of the incorporation of legumes in crop rotations and, if this is practical, should plan suitable rotation systems. HVA should also devise means of making available practical implements to turn the green manure under.*

COMMERCIAL FERTILIZERS. Total crop production would be increased tremendously if all, instead of two-thirds, of the land could be cropped each year. This could be accomplished by supplying the necessary soil nutrients by means of commercial fertilizers. In addition, the resulting continuous cultivation would improve soil tilth, increase organic matter content, and reduce the salinity hazard.

A conservative approach to a fertilizer purchase program dictates the desirability of spreading it over several years so that needs can be estimated yearly, farmers can be educated as to methods of use, credit facilities can be provided, and composition of the fertilizers can be changed from time to time if necessary.

It is recommended, therefore, that sufficient nitrogenous fertilizer be imported over a five-year period to provide about 30 pounds of nitrogen per acre per year for 1,000 acres the first year and then sufficient for 5,000, 10,000, 20,000 and 40,000 acres respectively in succeeding years. The entire program would cost about

$500,000, but from the increase in crop production alone it should be self-supporting after the first two years. It should be an integral part of the agricultural extension program and be initiated on 5-to 10-acre demonstration plots in 100 to 200 villages.

It is believed that a program following these suggestions, and applied to the approximately 500,000 acres which will be in cultivation under the Helmand Valley project, should at least double the production of all crops except grapes and orchard fruits.

Pests and Diseases

Plant diseases and insects are numerous, but the kinds present and the extent to which they damage crops are as yet undetermined. Control measures have not been introduced except a program of the Afghan Government to help combat periodic locust infestations. The number of plant diseases in the Helmand Valley, and their destructiveness, undoubtedly will increase as more crops are grown.

It is recommended that the ICA assign a plant pathologist-entomologist to the area for a few months to identify the prevalent destructive diseases and insects and to make practical recommendations on control measures, especially on the feasibility of using nicotine from tobacco and pyrethrum.

Weeds have recently become a serious problem in the newly irrigated areas, particularly where the water table is high. They compete with crop plants for nutrients and moisture and thereby decrease crop yields. In many localities, they are valuable for fuel and stock feed and, therefore, are not usually destroyed. The most valuable and toughest of these weeds is camel thorn (Alhagi Camelorum), a legume and important fuel source, which is multiplying rapidly in high water table areas. No work has been done on methods of weed eradication, nor on the relation between value of weeds as a source of fuel, feed and nitrogen (in the case of camel thorn) on the one hand and reduction in crop yield as a result of moisture and nutrient depletion by weeds on the other.

The ICA should undertake studies to determine whether or not weeds, particularly camel thorn, should be eradicated. If so, practical methods of eradication should be developed.

Farm Equipment

Farmers of the Valley are now seriously handicapped by their primitive and inefficient farming equipment. ICA advisers have taken some steps to demonstrate scythes as a more efficient harvesting implement than the presently used sickle. Light, steel mouldboard plows have been imported but, when demonstrated, were rejected by farmers whose light oxen could not pull them. A stationary thresher was set up during one harvest but was rejected by farmers after a very short trial because it cracked the grain intended to be used as seed, a defect which could readily have been corrected by adjustment of the machine by a competent operator.

As one means of increasing the efficiency and production of the farm economy, an improvement in the entire set of farm implements appears as a self-evident need. To meet this need the first step is the development and demonstration of equipment, practical for small farms and acceptable to farmers, as replacements for presently used farm implements. This will require some experimentation and cooperative work with groups of farmers. One of the most logical groups to work with would be a village of nomad settlers who are just learning farming methods and among whom the introduction of new farm implements may be easier than among the established and tradition-minded farmers. A second receptive group may be the farmers who are cultivating new lands in the Shamalan project.

It is recommended that ICA study the whole technology of Afghan farming and devise a set of practical farm implements to help reduce the present wastefulness of labor and time and increase the yield of harvested crops.

IMPROVED PLOWS. It is believed that experimentation will prove that the steel plows, now in ICA storage, can be pulled by yokes of sturdy oxen or other full-sized animals. Further field tests of these plows to settle this question should be fairly made. If favorable, demonstrations should be made for farmers who possess the animals to draw them. Otherwise, models for lightweight plows can be obtained from ICA missions in India and Libya, where local artisans have designed them for oxen and medium-weight horses. It is also suggested that experimentation could determine the best type of practical plow for ripping and turning over rough sod and alfalfa. Village blacksmiths could be furnished with materials to produce them.

OTHER EQUIPMENT. The farmers are badly in need of a simple harrow or spiked-platform drag to break up the soil and prepare a good seed bed. ICA can assist in designing an improved harrow or utilize an imported horse-drawn implement to demonstrate improvements that are possible and practical for use on small farms. Seeding now done by broadcasting can be accomplished by a simple push-type, wheeled seeder or a horse-drawn machine which covers the seed after it is dropped. The demonstration of scythes should be intensified. Threshing machines now locally available should be set up at harvest time at central points to which farmers can bring their wheat. Service of the thresher can be paid for in grain in the same manner as the miller is compensated in kind for grinding flour. Similar arrangements could be made with respect to machinery for land leveling, building dikes, and digging small ditches.

DEMONSTRATIONS. In attempting to change technical methods, four prerequisites should be considered. New implements should be demonstrated and tested with the local farmers as observers to assure their practicality and acceptability. To achieve greater utilization in other communities, the tools should be discussed in advance with groups of farmers and demonstrated at the time they are required in the cycle of farm operations. An adequate supply of implements for purchase

and credit facilities for purchasers should be made available. The problem of farm credit is discussed in Chapter VII.

Grinding of Flour

Village millers have customarily utilized the fall of water drawn from irrigation ditches to power their revolving stone flour mills. The continuation of this practice, which included cutting into the banks of main irrigation canals, has been damaging to new construction and wasteful of water. The HVA has necessarily stopped the construction of flour mills along its canal system. This has deprived millers of their livelihood and many communities of a facility for grinding their wheat and corn. Construction of mills with private water takeoffs along the Helmand River has not been satisfactory due to the changing water level and possibility of flooding the equipment.

The many drop structures in the main canals provide ample water power for operating flour mills. *It is recommended that ICA staff with the help of local engineers design and construct a simple power takeoff with the necessary water wheels, drives, and gears to turn the stone wheels of the existing mill equipment.* Agricultural extension workers can help install model mills as a demonstration when a plan has been devised.

Chapter IV
CONSTRUCTION AND DEVELOPMENT PROGRAM

IRRIGATION AND DRAINAGE WORK

General Plan of Development

The development program hinges basically on the storage reservoirs which insure the supply of irrigation water during the summer and fall months of the year. During these months, the rivers in the past were generally very low or completely dry and the planting of summer crops was usually impossible, and even the planting of winter crops was sometimes restricted. With the reservoirs now in operation, a regulated water supply gives assurance of annual crop production and even double cropping on good quality soils, and additional water is available for the irrigation of new lands.

In the North and Central Arghandab areas, extensive private canal systems have been distributing water for many years, but the operation has been inefficient. The many individual intakes at the Arghandab River are uncertain and unreliable and require alteration or repair nearly every year. Much land is wasted unnecessarily by the practice of locating several independently-owned canals, up to as many as seven, parallel to each other, thereby increasing evaporation and seepage and interfering with the movement of the farmers and their implements from one place to another. The old canals, in general, were built on an irregular alignment and are expensive to maintain. Even with the improved supply of water now available, full delivery of required water at the lower ends of the private ditch systems has been uncertain.

Somewhat similar conditions exist along the Helmand River, although the number of private canals is not so great due to the less highly developed agriculture in that region. There are, however, numerous separate diversion canals taking water from the Helmand River, and in some areas, particularly in the Darweshan, the existence of numerous parallel canals has been observed.

The present construction program will substitute a few major canals to take the place of many of the old private canals. In the Arghandab area, the South Canal will provide a permanent diversion from the river and will deliver water on an assured basis to the Patow power plant and into the principal existing private canals which serve the Central Arghandab area. The extension of the South Canal, known as the Tarnak Canal, will carry water across the upper end of the Central Arghandab area and deliver it into the Tarnak area.

Along the Helmand River, the main irrigation canals are the Boghra Canal, with a diversion structure north of Girishk and with a major extension known as the Shamalan Canal, and the Darweshan Canal running through the central portion of the Darweshan area. Both the Shamalan and Darweshan canals will



Figure 7

Boghra Diversion Dam in Helmand River. Sluiceway in Foreground



Figure 8

Section of Boghra Canal Shortly After Completion

deliver water to existing canal systems to a limited extent where they fit into the new layout.

Other features of the distribution system include the improvement and enlargement of an old canal through the Seraj area and the improvement of a small diversion canal, known as the Hazar Juft, in the Darweshan area.

As a necessary adjunct of any irrigation system, a comprehensive system of drainage canals and laterals is being constructed. These are essential to carry off surplus irrigation water and to provide an outlet for the farm laterals and drains which must be built to keep the ground water down. Another major feature of the program, largely to be taken care of by the Afghan Construction Unit (ACU) of the HVA, is the construction of the small irrigation laterals and sub-laterals and the laterals of the drainage system.

Both of the storage dams have been so constructed that power plants can be added at any time. On two of the canals, the Boghra and the South, major drop structures are so designed that the fall in the canal can be utilized for substantial amounts of power development, and a number of other drop structures afford the opportunity for developing lesser amounts of power when needed.

The construction program has also included a large amount of road construction such as the regional roads from Kandahar to Spin Baldak and to Girishk and Lashkar Gah. Other roads provide access to the various projects and movement between projects. In addition, many roads are constructed on canal banks, thereby affording access to the farms within the project area.

As a necessary phase of construction operation, several well-equipped, semi-permanent camps have been built such as those at Manzel Bagh, Chah-i-Anjir, Marja and Darweshan.

Construction Contracts

All of the major construction work on the Helmand Valley project has been performed by MKA under contracts with the Government of Afghanistan. The work under the first contract involved an expenditure of $17,099,355.67, which was used principally in the Helmand Valley but covered a number of small surveys and projects in other parts of the country. The second contract, executed in 1950, involved a total expenditure of $30,502,461.81, all but $93,318.31 of which was spent within the project. It was financed in part by the first Export-Import Bank loan of $21 million.

The construction program now underway in the Helmand Valley is being carried on by MKA under its third contract with the Government. The work is being financed in part by the second Export-Import Bank loan.

All work has been thoroughly designed in accordance with the best American standards and the quality of workmanship is excellent.

Delays in Starting Third Contract

The second loan agreement between the Royal Government of Afghanistan

Authority. It has made notable contributions in the fields of public administration and agricultural experimentation. Its program has not been very effective in raising general agricultural production or improving the welfare of the people of the Valley. Projects have tended frequently to stimulate unrealistic expectations among the Afghans or fall short of meeting primary needs. Technical assistance has in some cases been diverted into experimentation with crops and strains of livestock rather than toward direct help in the improvement of farm methods and in demonstrations and training to meet the basic problems of water management and soil salinity. Practical improvements in farm equipment and selective breeding of native livestock, which might initiate effective changes in present farm practices, have not received sufficient attention. The program has been handicapped by recruitment problems but perhaps more seriously by the frustration of ICA specialists caused by the lack of a sufficient number of Afghan counterparts (technically trained officials) to receive and profit by their advice and by the difficulty of adapting to the general understaffing which prevails in the HVA organization. (Chapter V)

14. CONTEMPLATED INVESTMENT. The total cost of irrigation and land development had reached almost $63 million in the Upper Helmand for irrigation and land development, as of the end of June, 1956. The added cost of completing the program as planned by the Afghan agencies would raise the total to approximately $98 million. This would constitute an investment of approximately $230 per acre for all lands, both old and new, in the Upper Helmand. This addition of $35 million in total cost in all currencies would include an additional expenditure of some $26 million in dollars which, unless properly phased over a period of years, would constitute a difficult foreign exchange burden for the Government of Afghanistan. (Chapter XI)

15. AFGHAN ECONOMY. A study of the Afghan economy in general shows that approximately 20 percent of the government's total expenditures has gone into the Helmand Valley for several years. Because of numerous additional obligations recently undertaken by the Government, it appears doubtful that the same percentage of contribution to the Helmand Valley project can be continued. (Chapter IX)

16. RELATIONS WITH IRAN. The Government of Afghanistan is fully aware of the implications of its water development program in the Helmand Valley upon its relations with Iran. The development under way and contemplated would not reduce the annual supply of usable water to Iran below the normal provided by an unregulated river. (Chapter IX)

17. RELATIONS WITH PAKISTAN. Afghanistan is also acutely aware of the need for facilitation of the movement of Afghan imports and exports through Pakistan. The general development of the Helmand Valley depends upon the smooth flow of goods through that country. (Chapter IX)



Figure 9
Downstream Slope at Kajakai Dam



Figure 10
Downstream Slope of Arghandab Dam

and the Export-Import Bank was dated May 14, 1954. It established a line of credit in the amount of $18,500,000, to be spread in seven categories, but provided that transfers could be made from one category to another with the approval of both parties. It also provided that Afghanistan would provide all costs of the specified work which might be in excess of the amounts provided by the loan.

On June 21, 1954, the third contract was executed between the HVA and MKA providing for the performance of the work specified in the bank loan agreement. After execution there was some delay in ratification by the Government of Afghanistan, but approval was finally given on February 18, 1955. After approval of the contract, MKA proceeded with portions of the work remaining to be finished after completion of the second contract and also proceeded with plans for the new work contemplated in the third contract. Necessary equipment for the new work was ordered, but delivery was seriously delayed by the closing of the international border between Afghanistan and Pakistan during the period from May 21 to November 30, 1955.

The prosecution of the new work was also somewhat delayed pending decision by the Afghan Government and the Export-Import Bank as to the specific new projects to be undertaken. Final selection of these projects and the amounts to be contributed by the Export-Import Bank to each was approved by both parties on January 27, 1956. At that time, the total estimated cost of the work to be included was $24,824,647.

Allocation of Loan Funds

Not all of the amount of the bank loan was made available for use in paying for the above work due to the fact that the sum of $3,300,000 was allocated to the Afghan Construction Unit (ACU) to be used for the purpose of carrying on the necessary land preparation and lateral ditch construction, intended to follow the completion of the major irrigation and drainage works. A further item of $50,000 was set apart for an afforestation program, the net amount remaining for the construction program, therefore, being $15,150,000. Experience on previous contracts had shown that the dollar costs were usually about 75 percent of overall costs. Consequently, under the third contract, the amount of the loan allocation would be sufficient only for a $20 million construction program, this being nearly $5 million short of the estimated dollar cost of $24,824,647 for the program contemplated.

Revised Cost Estimates — Third Contract

On August 7, 1956, MKA prepared a general summary of estimates and costs as of June 26, 1956. Costs had been re-estimated, making use of the latest surveys and taking into account unforeseen difficulties that had appeared in connection with certain parts of the work. The new estimated cost of the work covered by the bank loan program was stated to be $29,794,571 in all currencies, including the contractor's fee. At the usual ratio of 75 percent to 25 percent, this total program would require an outlay of $22,345,928 in dollars, which is

$7,195,928 in excess of the bank loan funds available. At the present rate of expenditure, the available dollar funds will be exhausted in the fall of 1957, and about 68 percent of the planned work will be complete.

The serious shortage of about $7,196,000, in dollar funds, naturally was a matter of great concern to both the HVA and the contractor. It appeared obvious that some drastic revision of the construction program was necessary unless additional dollar funds could be obtained. The HVA officials expressed themselves as being firm in their desire to complete the whole program as planned but were unable to indicate where the additional dollar funds could be obtained.



Figure 11

Typical Irrigation Lateral at Drain Crossing

Total Construction Program

Assuming that the necessary additional financing might be obtained and that all current work would be completed on the basis of the cost estimates now supplied by the contractor, it is possible to describe all of the work under the three contracts which would be completed at the termination of the contract now under way. This construction work is shown in its broad outlines on Plate III, and the works constructed and planned and the general expenditures made and to be made are briefly summarized in Table No. 3. The present status of each project is indicated in the table.

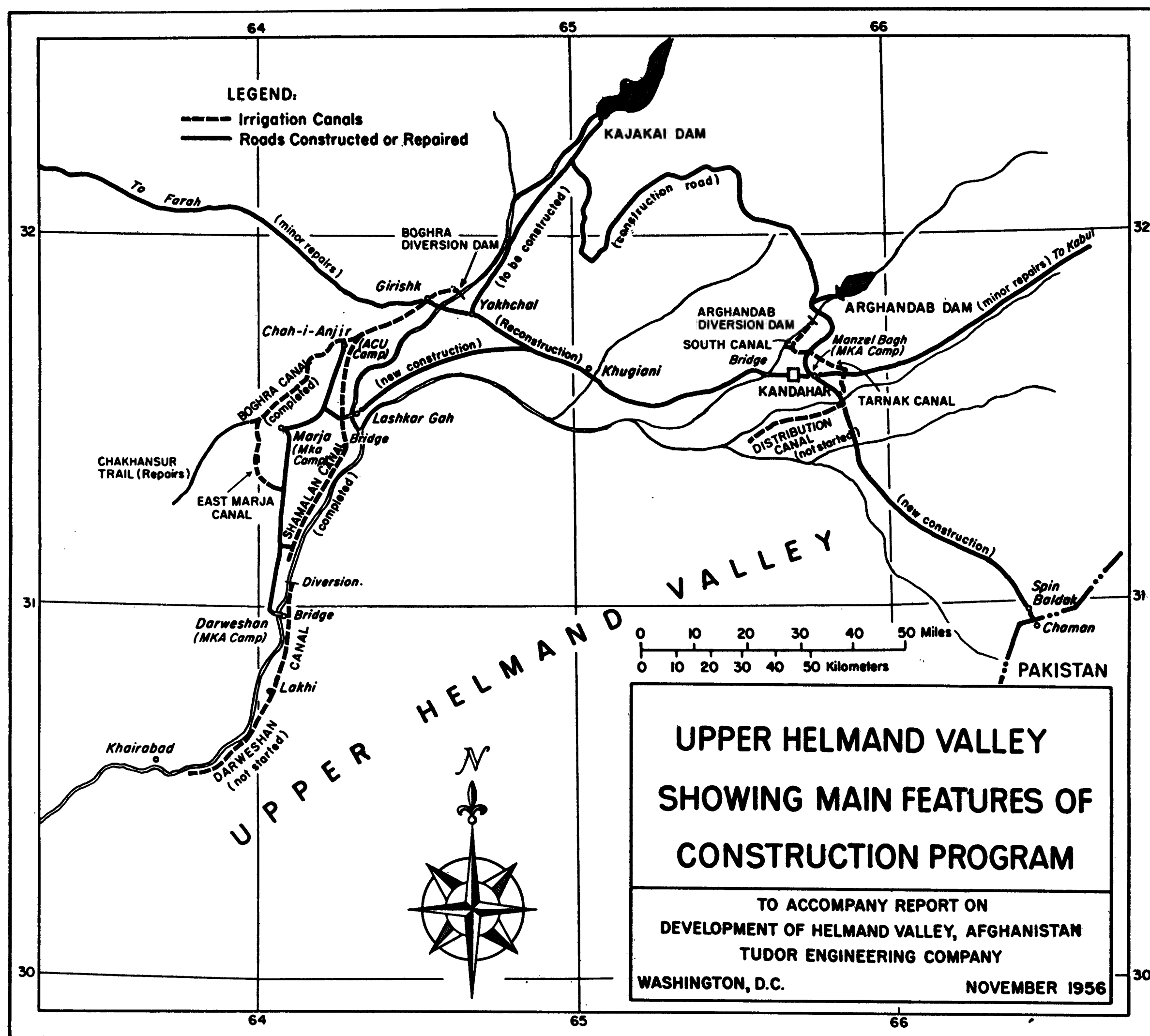

LEGEND:
Irrigation Canals
Roads Constructed or Repaired
KAJAKAI DAM
To Farah
(minor repairs)
BOGHRA
DIVERSION DAM
(to be constructed)
(construction road)
Girishk
Yakhchal
(Reconstruction)
Khugiani
Chah-i-Anjir
(ACU Camp)
(new construction)
BOGHRA CANAL (completed)
Lashkar Gah
Bridge
Marja (Mka Camp)
CHAKHANSUR TRAIL (Repairs)
EAST MARJA CANAL
SHAMALAN CANAL
(completed)
Diversion.
Bridge
Darweshan (MKA Camp)
CANAL
Lakhi
Khairabad
DARWESHAN (not started)
ARGHANDAB DIVERSION DAM
SOUTH CANAL
Bridge
ARGHANDAB DAM
(minor repairs) To Kabul
Manzel Bagh (MKA Camp)
KANDAHAR
TARNAK CANAL
DISTRIBUTION CANAL (not started)
(new construction)
Spin Baldak
Chaman
PAKISTAN
UPPER HELMAND VALLEY
0 10 20 30 40 50 Miles
0 10 20 30 40 50 Kilometers
UPPER HELMAND VALLEY
SHOWING MAIN FEATURES OF
CONSTRUCTION PROGRAM
TO ACCOMPANY REPORT ON
DEVELOPMENT OF HELMAND VALLEY, AFGHANISTAN
TUDOR ENGINEERING COMPANY
WASHINGTON, D.C.
NOVEMBER 1956
64
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32
31
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Plate III

Table No. 3

CONSTRUCTION PROGRAM UNDER THREE MKA CONTRACTS

(If carried to completion as now planned)

Description	*Estimated Cost All Currencies*
Storage Dams	
* Kajakai Dam, on Helmand River, 45 miles above Girishk. Completed in 1954. Live storage capacity—1,495,000 ac. ft. Reservoir area at spillway level—26,800 acs.	$12,753,645
* Arghandab Dam, on Arghandab River, 30 miles above Kandahar. Completed in 1952. Live storage capacity—388,000 ac. ft. Reservoir area at spillway level—3,780 acs.	6,726,092
Distribution Works	
* Boghra Diversion and Canal system including:	
Boghra Diversion Dam on the Helmand River, 5 miles above Girishk and Boghra Canal, 75 km. long, intake capacity 2,600 sec. ft. Completed in 1952.	
Shamalan Canal, a branch of the Boghra Canal, 66 km. long. Intake capacity 750 sec. ft. Completed.	
East Marja Canal, a branch of the Boghra Canal, 19 km. long. Intake capacity 450 sec. ft. Completed.	
Total Cost. Boghra system	14,196,102
Arghandab Diversion Dam, on Arghandab River about 15 miles above Kandahar and the South Canal, 17 km. long, providing service to existing irrigation canals, intake capacity 1,500 sec. ft. Under construction	3,077,844
Tarnak Canal, an extension of the South Canal, extending across the Tarnak River and serving the Tarnak area. Under construction	2,639,279
Irrigation and Drainage Systems	
Nad-i-Ali area, main irrigation and drainage systems completed. Additional drainage work scheduled to be completed in 1956.	2,299,262
Marja area, irrigation and drainage systems scheduled to be completed in 1956	3,858,591
Seraj area, new canal intake and canal improvement. Not started, except surveys.	3,029,670
Shamalan area, irrigation and drainage system. To be completed in 1956.	1,856,928
Darweshan area, diversions and irrigation and drainage systems. Not started, except surveys and camp	6,868,281
North Arghandab area, improved intake structures. Not started.	174,548
Central Arghandab area, surveys for improved distribution. Not started.	191,846
Tarnak area, irrigation and drainage system. Not started except soil and drainage surveys.	3,335,573

Item	Cost
Girishk Power Development at drop in Boghra Canal, including transmission lines.	
Awaiting generating equipment. Will be completed 1957.	1,634,762
Road Construction	
* Kandahar to Spin Baldak, near Pakistan border. Completed in 1949. Length 114 km. (including maintenance for brief period).	5,612,736
Kandahar to Girishk, resurfacing, structures and Arghandab bridge. Length 125 km. Scheduled to be completed 1956.	544,370
* Lashkar Gah to Kandahar-Girishk Road, including bridge. Length 47 km. Completed.	419,288
* Lashkar Gah to Nad-i-Ali and Marja. Length 31 km. Completed.	41,376
* Marja to Darweshan including bridge. Length 37 km. Completed.	378,953
Girishk-Kandahar Road to Kajakai Dam. Length 125 km. Not started.	283,561
* Kandahar to Arghandab Dam and Kajakai Dam (construction road; cost included in construction of dams).	
* Girishk to Chah-i-Anjir and thence southerly along Boghra and Shamalan Canals. Length 95 km. Completed	437,197
* Girishk to Dilaram, repairs.	1,201
* Kandahar to Kabul, repairs.	2,394
* General road repairs	41,721
* Chakhansur trail, completed.	21,190
Miscellaneous	
* Canal operation and maintenance.	120,502
* Assistance to Helmand Valley Authority, buildings, etc.	255,130
General surveys and engineering.	1,577,960
General expense, undistributed.	1,041,963
Contractor's fees (1950 and 1954 contracts).	2,624,336
Sub-total, Helmand Valley project costs.	76,046,301
* Work outside Helmand Valley—Completed.	1,350,041
Total estimated contract payments at completion of all proposed work	$77,396,342

* Indicates completed unit

Status of Current Contract as of June 26, 1956

The estimates of cost, prepared by MKA on August 7, 1956, showed that the total expenditure under the current contract to June 26, 1956, including the proportionate part of the contractor's estimated fee, was $7,476,878. At that time, a number of the projects which remained unfinished at the termination of the second contract and a number of surveys and road projects had been completed. The new work performed to that date included irrigation and drainage work in the Nad-i-Ali, Shamalan, Marja and Arghandab areas and camp construction in the Darweshan area. The largest items of new work undertaken were the

Table No. 4

ALLOCATION OF PROJECT COSTS

UNDER THREE MKA CONTRACTS TO JUNE 1956

Item & Area	*Cost All Currencies*
Irrigation and Drainage:	
Upper Helmand Valley	$38,149,280
Lower Helmand Valley	2,016,591
Total, Irrigation and Drainage	$40,165,871
Power	$6,026,728
Highways related to Valley	6,733,363
General Surveys	353,018
HVA Building Construction	272,301
Operation & Maintenance of Canals	140,592
Outside Project Area	1,386,777
Grand Total	$55,078,650

Arghandab Diversion Dam, the South Canal serving the Central Arghandab area, and the Tarnak Canal designed to serve the Tarnak area. Other work performed included road work and surveys and the purchase of equipment for the Girishk power development.

Allocation of Total Costs

The total expenditure under all three contracts up to June 26, 1956, was $55,078,650.48. For the purpose of indicating where the principal expenditures were made, the total cost has been allocated to main categories of work and to the upper and lower portions of the Helmand Valley as shown in Table No. 4. Items not directly related to irrigation or land development in the Valley were first set apart as shown. The cost of the storage dams was prorated on the basis of 25 percent to power and 75 percent to irrigation. The irrigation portion was allocated to project areas in proportion to acreage, except that the acreages in the Lower Helmand below Khairabad were divided by two for this purpose, for the reason that benefits will not be fully realized in these areas for a good many years. The remaining items of irrigation, drainage and related work were allocated to the particular areas in which the work was done or the benefit gained.

LAND DEVELOPMENT WORK

The construction work undertaken through the present MKA contract provides only irrigation canals, main drainage canals, and a limited number of laterals. After this work is completed, there remains a large amount of land preparation and the extension of the distribution and drainage systems to put the land in shape for occupation by the farmers. This work is being handled by the ACU using, in part, the $3,300,000 in dollar funds allocated by the Eximbank. The ACU and its operations are described in some detail in Chapter VI.

At the request of the Survey Team, the ACU made an estimate of the cost of the essential land development work which will remain to be done in the various project areas after the major contract work is completed. Two estimates were supplied, one including land leveling and the construction of necessary irrigation laterals and accumulator drains and the other covering the farm drainage work which would still be necessary to serve the individual farms. The first estimate shows that for the Nad-i-Ali, Marja, Shamalan, Darweshan, Seraj and Tarnak areas, all of which are embraced in the present development program, the cost of the leveling and the irrigation laterals and accumulator drains would be $15,605,000 in all currencies. The second estimate shows that the additional cost of farm drains would be $14,900,000. It is believed that the farm drains can be constructed by the farmers, although some assistance from HVA may be necessary, and consequently further estimates in this report have disregarded this element of the total cost.

Funds Required

The funds required for the primary land development work needed in the present program are estimated as follows:

Total Cost of Work, all currencies	$15,605,000
Amount Expended to June 30, 1956	3,021,000
Additional Amount to be Spent	12,584,000
Balance on Hand, July 30, 1956, all currencies	1,940,000
Additional Funds Required, all currencies	$10,680,000
Amount Required in Dollars (75% of Total Cost)	$11,704,000
Less Eximbank Allocation	3,300,000
Net Dollars Required	$8,404,000

Scheduling and Lag behind Construction

Estimates of progress submitted by the ACU showed that the time required to do the land development work, described above, with the personnel and equip-

ment now in sight might be as long as five to six years. This would place the completion date about four years after MKA completion of the irrigation system.

SUMMARY, CONSTRUCTION AND LAND DEVELOPMENT

It should be noted that the excessive time lag between completion of major construction and preparation of land for farming clearly shows that the present program is very seriously out of balance.

It should also be noted that the present program would require estimated additional dollar funds, not now available, as follows:

For Completion of Present Construction Contract	$7,196,000
For Completion of Land Development Work	8,404,000
Total Dollar Funds Required	$15,600,000

Chapter V
THE HELMAND VALLEY AUTHORITY

ESTABLISHMENT

The Helmand Valley Authority was established on December 4, 1952, under the provisions of "Rules of Procedure" adopted by His Majesty, the King of Afghanistan, and the Cabinet. The purposes of the organization were stated to be "maintaining and operating the properties now owned by the Government of Afghanistan in and near the Helmand River drainage basin, in the interest of the national welfare and for the conservation and development and use of the nation's land and water resources, and for land reclamation and settlement and agricultural development, and to control the destructive flood waters in the Helmand River and its tributaries, and for industrial development and hydro-electric power development."

To carry out these functions, a Board of Directors was appointed by the Prime Minister with the advice and consent of His Majesty, the King of Afghanistan. This Board is composed of three members, of whom one is designated by the Prime Minister as President and the other two as Vice-Presidents. Their terms of office are nine years, with the term of one member ending each three years.

The Board of Directors is administratively responsible to the Prime Minister, through the Supreme Council for the Helmand Valley. The Supreme Council is composed of Ministers especially concerned with the problems of the Helmand Valley and also includes the President of the HVA. The Board of Directors is authorized, at its own discretion, to present any matter directly for the consideration, advice and decision of the Prime Minister or the Cabinet Council or both.

There is a Regional Advisory Board composed of five members appointed by the Helmand Valley Authority Board from among officials of the government or other persons having special competence. It is the duty of the Regional Advisory Council to consult and advise with the Board of the Helmand Valley Authority when requested.

RELATION TO CENTRAL AND PROVINCIAL GOVERNMENTS

The HVA necessarily has close and constant relationships with the governments of the local provinces, as well as the central government from which it derives its power.

The Royal Government of Afghanistan is a constitutional monarchy. All governmental powers derive from the King, who appoints a Supreme Council of State (Cabinet) and subordinate Ministers, and a Senate of 45 members, whose tenure is for life. There is also a National Assembly, composed of 171 deputies

18. BENEFITS TO DATE. The Helmand Valley project up to this date has produced no direct revenues for the government or the HVA because of the uncertainty of land ownership and the lack of suitable tax laws based on equitable property assessments. Nevertheless, there have been numerous and substantial benefits to local farmers and to the region as a whole. The actual value of crop production in the Upper Helmand Valley has increased during the past five years by about 205,000,000 afghanis per year or about $10 million at the official rate of exchange. The lands irrigated annually have increased by about 104,000 acres since the first additional water supplies were provided by the project. Further substantial benefits will accrue as the development proceeds. In addition, many intangible benefits are apparent. (Chapter XI)

19. REVISIONS AND EXTENSIONS OF PROJECT. Continuation of development work on the project is essential to reap the full benefits of the large investment already made. However, for reasons already indicated, substantial modification of the schedule of operations seems essential. This is true not only because of the shortage of both internal and external financial resources but also because of the demonstrated unsuitability of certain areas for full development as originally contemplated and because of the excessive time lag between completion of major construction work on each part of the project and the preparation of the land for settlement. Concentration of effort and resources on selected areas for the time being seems highly desirable, and detailed recommendations as to the manner in which such concentration should be accomplished are presented in the report. At the same time, it is important to move ahead with the development of power and industry to achieve balanced economic development of the area, and recommendations in these fields are also presented. If these recommendations are followed, it is estimated that the additional financing required over the next three or four years would be about $24 million dollars in all currencies, and that about $6.8 million in United States dollars would be needed during that period over and above the amounts now available from the second Eximbank loan. (Chapter X)

20. FUTURE BENEFITS. It is estimated that the revised program would result in increasing the total value of production in the Valley by about 300 million afghanis per year (about $14 million at the official rate of exchange) above the present level within the next six to eight years. (Chapter XI)

21. GENERAL IMPORTANCE OF PROJECT. The success of the Helmand Valley is of primary importance to the future economic welfare of Afghanistan. It is believed that the total investment in all types of development in the Upper Helmand will be equalled ultimately by the cumulative economic benefits in that area and that the social and intangible benefits will be of tremendous additional value. The project is also of importance to the United States because, rightly or wrongly, it is looked upon in Afghanistan as an American project.

elected from different parts of the country. This body, together with the Senate, is empowered to submit proposed legislation to the King and to ratify royal decrees. In the absence of specific legislation, Islamic law (Shariat) is interpreted and applied by the courts.

The area placed under the administration of the Helmand Valley Authority lies within the four provinces of Kandahar, Girishk, Farah, and Herat, although the current development program is wholly within the first two.

The provincial governments, as executive agencies of the Government of Afghanistan, are responsible for the usual governmental functions such as police, justice, tax collection, and education. The governor of each province, appointed by the Ministry of Interior, ordinarily has on his staff a provincial chief of police, also representing the Ministry of Interior; the commandant of the local army garrison; magistrates of the primary and secondary courts; an administrator of tax collections under the Ministry of Finance; and representatives of the Ministries of Agriculture, Education, and Health. The Ministry of Interior is initiating the first detailed census of the country and, as this program proceeds, is adding census takers to each governor's staff.

The Governor of Girishk has a smaller staff than the other governors and, since his authority has recently been subordinated to that of the President of the Helmand Valley Authority, his duties and the functions of his staff now differ from those of a normal provincial government organization.

Each province is divided into districts administered by a sub-governor or "hakim," and each district is further subdivided and administered by an officer known as an "alakadar." The district and subdistrict officers meet with representatives of the people, adjust problems that can be settled out of court, administer law and order, and direct the collection of taxes. Representatives of other Ministries are assigned to staffs of district governors according to the importance and size of their areas and the ability of the Ministry to provide personnel.

The local government appoints a man of each town and large village as its administrator or "malik." He is usually a locally recognized leader and "khan," who may hold his office by popular consent for his life time. The people, which implies the khans and heads of families, may elect a community spokesman or "wakil" who presents their problems before the local district governor. Each subdistrict is entitled by law to appoint a wakil as local representative to the national General Assembly. The wakil may be the malik of an important town and is usually a leading khan.

Provincial Health Department

A chief medical officer of the Ministry of Health directs the health programs of the provinces. A hospital for males, an outpatient department, a clinical laboratory, an X-ray center, a dental clinic, and maternal child help and midwifery programs comprise the standard medical facilities and services of the health department. In Kandahar, the Ministry operates a hospital for women where the

training of midwives is given. Girishk Province has an infirmary with a laboratory, pharmacy and a small and modestly equipped surgery.

The provincial health departments carry on programs in malaria and typhus control, smallpox vaccinations, and treatment of venereal disease. Teams of sanitarians, trained at the malaria institute organized and assisted by the UN-World Health Organization (UN-WHO), conduct seasonal spraying of mosquitoes. During the remainder of the year, these sanitarians, trained also as male nurses, serve in public health education programs and demonstrations.

Provincial Education Department

A director of education is assigned to each provincial government. In the City of Kandahar, this official is responsible for the administration of a high school and three elementary schools of six grades for both boys and girls. ICA, through contract with the University of Wyoming, has this year placed a vocational agricultural teacher at the high school. The UN-WHO currently has under consideration a plan to establish a vocational training school, staffed with German teachers, at Kandahar.

The Town of Girishk has only an elementary school with six grades. The majority of villages of Kandahar and Girishk provinces have no schools. The Ministry of Education has offered to provide teachers in the Helmand Valley area if the Helmand Valley Authority will provide schools buildings. At present a few "mullahs," or religious leaders, conduct schools for memorizing of the Koran and to teach children to read and write.

ICA TECHNICAL ASSISTANCE

Program

ICA in the Helmand Valley is providing a program of technical assistance to the HVA administrative organization and to its departments (the Afghan Construction Unit, Operations and Maintenance, Engineering Planning, Hydrology, Agriculture, and Health). This technical assistance program provides advisers to the departmental directors and conducts demonstrations of improved methods and equipment. The program also operates projects to train personnel for the staffing of the HVA. ICA had in its program for 1955-56, and currently operating in its first quarter of 1956-57, eight technical assistance projects, as follows:

HELMAND CANAL OPERATION AND MAINTENANCE PROJECT is providing heavy equipment for "additional repair and maintenance of the canal system on an emergency basis necessitated by advancing deterioration." It is committed to "on-the-job training of Afghan personnel in canal operations" and "intensification of training of all Afghan personnel of the Canal Operation and Maintenance Division." The program also proposes "replacement of ICA engineering staff by contract with individuals or a technical services firm, with ICA paying HVA dollar costs, to assist in operations." All positions for ICA advisers on operation and maintenance are presently vacant.

HELMAND SURFACE WATER INVESTIGATION PROJECT provides a hydrologist through arrangement with the Water Resources Division of the United States Geological Survey. This technician supervises the measurement of surface water flow and the maintenance of surface water records and trains Afghan employees assigned to the project.

HELMAND AGRICULTURAL DEVELOPMENT PROJECT assists through advisory services "the acceleration of land reclamation and development and agricultural extension work." Agricultural extension and other training is provided by ICA agricultural technicians as discussed herein under the program for rural development and vocational education.

HELMAND PUBLIC HEALTH AND SANITATION PROJECT proposes assistance to the Public Health Centers at Lashkar Gah and Girishk, the continuation of the village health program, assistance in training of village-level workers and general guidance in health matters to the rural development program. It also provides training abroad for Afghans. Assistance to the HVA public health program has recently been inactive due to vacancies in the positions for the ICA public health adviser, public health nurse and sanitary engineer.

VOCATIONAL AGRICULTURAL PROJECT provides, under a contract with the University of Wyoming, a staff of agricultural instructors and research workers at the Vocational Agriculture School at Kabul. As part of this project, a vocational agriculture instructor has been assigned to teach at the secondary school at Kandahar.

HELMAND TRAINING PROJECT supports a program of "training of Afghans in certain vocational and technical skills, which is not otherwise available in the Helmand Valley."

HELMAND PUBLIC ADMINISTRATION PROJECT "provides assistance to HVA in its program of introducing established methods and techniques in fields of general administration, administrative organization, administrative services, and property management." The Adviser in Public Administration serves as acting coordinator of the Helmand Valley ICA staff and participates in the Vocational Training Project. The program also provides overseas training of HVA administrative personnel.

HELMAND VALLEY RURAL DEVELOPMENT PROJECT, to improve agriculture and general living conditions of the population, has as its specific purpose, "the improvement of farming methods, the improvement of sanitation and health conditions, the development of handicrafts, the development of village access roads and communications, and the provision of greater educational opportunity." This project creates a position for a rural development specialist as a project adviser, and supplies motor vehicles, model agricultural tools, seeds, insecticides, training school materials, and handicraft equipment. Through its training program and cooperation with the Vice-President of the Agriculture Division this

project contemplates the establishment of a Rural Development Division in the HVA organization.

Staff

In the summer of 1956, ICA had 10 members on its technical staff in the Helmand Valley. The Public Administration Adviser was acting as coordinator. Five specialists were advising on HVA agricultural operations or conducting field experiments. One specialist in vocational agriculture was directing a mechanics and clerical training program; a specialist in agricultural extension work was acting chief of the rural development training program; and a specialist in water surface investigations and a hydrologist (temporarily on leave) were directing river runoff measurements. An adviser in agricultural extension work and an auditing specialist had been recruited, but had not arrived in Afghanistan. Twelve established positions were vacant.

Recommendations

The Survey Team has specific recommendations to make about the filling or not filling of several existing vacancies and the addition of other technical advisers to the ICA staff. Comments on some of these positions are made elsewhere in appropriate sections of the report. For convenience, recommendations on all proposed ICA positions are summarized here.

To assist the HVA in carrying out or improving its operations as proposed in this report, it is recommended that ICA employ or contract for the following additional staff:

DEPUTY DIRECTOR. Under the direction of the ICA at Kabul, a deputy should be appointed with limited authority to assume local direction and provide coordination of the ICA Program in the Helmand Valley. He would fill the position now created in the ICA staffing pattern for a coordinator.

IRRIGATION AGRICULTURIST. To be employed as a technical consultant and training adviser on the application of water to farm land and the leaching process.

PLANT PATHOLOGIST-ENTOMOLOGIST. To be employed through contract on a temporary basis, to investigate plant diseases and recommend control measures.

IRRIGATION ENGINEER. One technical consultant and training adviser on irrigation management and power distribution should be appointed as Chief of Canal Operation and Maintenance Project. The two positions for operation and maintenance specialists as proposed by ICA should not be filled.

EQUIPMENT OPERATION AND MAINTENANCE SUPERINTENDENT. This position should be filled by an experienced equipment and automobile repair specialist to supervise and provide training in the maintenance and repair of the HVA construction and automotive equipment at the Chah-i-Anjir shop.

FARM MACHINERY SPECIALIST. The position designated for a Farm Machinery Mechanic should be filled by a specialist capable of designing or introducing improved farm equipment for use by Helmand Valley farmers.

PUBLIC HEALTH TEAM. Contract should be made with a school of public health for a team to conduct surveys and provide demonstration in public health procedures and training. This team should include:

Public Health Officer and Adviser,
Public Health Nurse,
Public Health Educator,
Sanitary Engineer.

ADVISER IN RURAL DEVELOPMENT. An experienced rural development specialist should be employed to direct the rural development assistance program in the Helmand Valley and serve as ICA adviser to the Government of Afghanistan.

SOCIAL ECONOMIST. This member should be employed to conduct field studies of rural cultures and land tenure systems of the Helmand Valley and to provide advice and training in methods of community organization.

HANDICRAFT SPECIALIST. A specialist to work with the textile specialist now on the ICA staff in developing a full handicraft program in the villages of the Helmand Valley.

OTHER VACANT POSITIONS. It is recommended that filling of the following vacant positions be deferred:

Technical Training Specialist,
Extension Training Specialist,
Accounting Specialist.

PLAN OF ORGANIZATION OF HVA

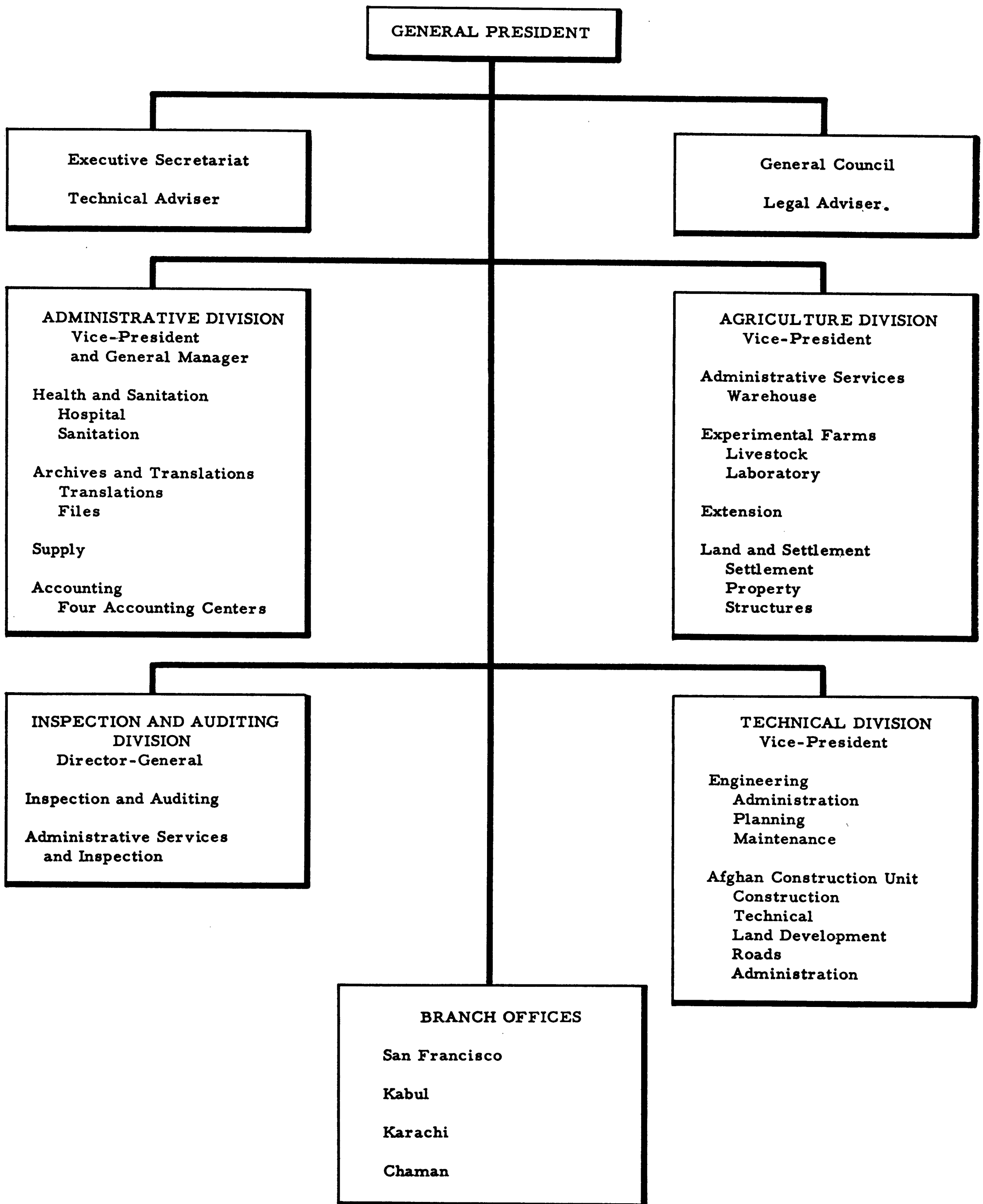
Present Organization

The general plan of organization of the HVA is shown on the accompanying chart, designated "Present Organization" (Plate IV). Not all of the administrative units shown on the chart have actually been created, but the chart has been used as a guide toward the building of the administrative staff.

Full administrative authority rests in the hands of the General President. He is assisted by an American Technical Adviser, employed by the HVA pursuant to one of the stipulations of the loan to the Government of Afghanistan by the U. S. Export-Import Bank. A Secretariat, Legal Adviser, and Information Officer are directly attached to the Office of the President. A senior Vice-President directs the Administration Division but has little authority for making independent decisions when the President is absent from the development area. A second Vice-President is in charge of the Agriculture Division which includes the administration and settlement of the Nad-i-Ali and Marja projects. He acts in the ca-

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PRESENT ORGANIZATION



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pacity of Director when the President and senior Vice President are absent. A third Vice President is in charge of the Technical Division. His responsibilities include direction of the Engineering Department and the Afghan Construction Unit.

In addition to the three major divisions under Vice Presidents, there is a general Office of Inspection and Auditing, which is responsible for all accounting and auditing and provides special administrative services. Proposed branch offices at Kabul, at Chaman and Karachi in Pakistan, and the liaison office with the International Engineering Company at San Francisco, California, are grouped in the fifth division.

Organization Proposed by ICA

In June 1955, ICA proposed a line and staff organization plan for the HVA. Although this has received general approval of HVA officers and the Prime Minister, it has not been formally adopted by the Government of Afghanistan. Subsequently, ICA submitted a second plan, showing a straight line organization which was not significantly different from the first. The line organization plan shows the position of the General President with his Secretariat and an Office of Audit and Inspection; an Office for Settlement and Development; an Office for Administration, including a Department of Education and Training; an Office for Technical Services; and suboffices for liaison at Kabul, Manzel Bagh, and San Francisco. The line and staff plan proposes only two major offices, an Office of Operations and an Office of Staff Services, each directed by a Vice-President. This eliminates the Office of Technical Services and the Vice-President in charge. No provision is made for a Department of Education and Training.

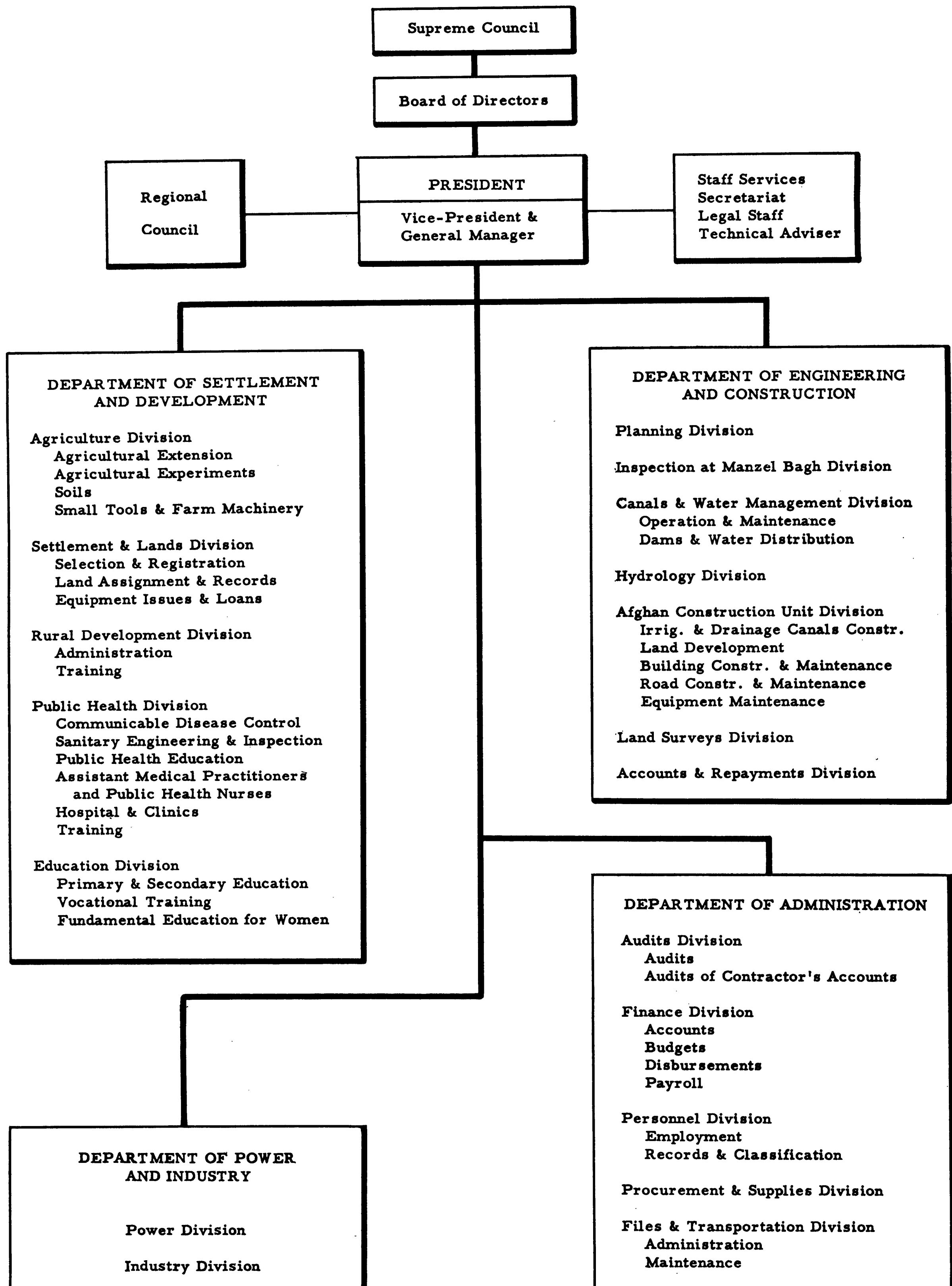
In the present organization plan of HVA and in the ICA proposed plans, there is some separation of related functions, such as engineering and construction, and in some places a mixture of staff and operational activities. An organization which groups related functions in single divisions appears to be the most logical pattern for an administration which is undertaking as many different activities as the HVA. A systematic plan of organization with clear-cut division of functions and the inclusion of all present and foreseeable activities appears desirable.

Recommended Organization Plan

A line and staff plan with four operational offices and one staff administrative office, as shown on the accompanying chart (Plate V), is recommended. This plan provides a frame-work in which present officers and their departments can be placed and into which future staff and activities can be introduced without basic organizational changes. As shown on the chart, the President is assisted by a senior Vice-President, acting as General Manager. Three other Vice-Presidents are in charge of departments of related operational components and a Director General is in charge of a Department of Administration. The major func-

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PROPOSED ORGANIZATION CHART



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tions of each department are assigned to individual divisions and each division is divided into sections to carry out separate responsibilities.

The plan assumes a greater delegation of authority and more decentralization of administration than exist in the present organization. The General Manager should have authority to carry out regular operations in accordance with approved policy and should have the power to act for the President when he is absent from the Helmand Valley. The General Manager should also be responsible for the integration of programs and functions of the four operating departments. To carry out the divisional functions efficiently, operational authority should be delegated to each Vice-President and to the Director General who, in turn, should delegate to their Directors of Divisions the authority necessary to perform their duties.

The functions to be performed by the various units of the proposed organization are as follows:

OFFICE OF THE PRESIDENT, directed by the President and assisted by the Vice-President and General Manager. The Office is responsible for over-all direction of the HVA and the coordination of all services for the general development of the natural resources and the people under its jurisdiction. Attached as staff to the Office of the President are:

EXECUTIVE SECRETARIAT, serving the President and the Board of Directors;

LEGAL STAFF, providing counsel to the President and the Board of Directors and legal services to officers and Departments;

TECHNICAL ADVISER, providing engineering and technical counsel to the President and the heads of Departments; and

DEPARTMENT OF SETTLEMENT AND DEVELOPMENT, Vice-President in charge, is responsible for the supervision and administration of five Divisions, maintaining the integration of these Divisions in providing public services to the people of the Valley and carrying on necessary studies in agricultural and social research.

DIVISION OF RURAL DEVELOPMENT, Director in charge, plans, organizes and directs the rural development program as the line operation for the development of the people and their communities.

ADMINISTRATION, provides supervision of the leaders of the blocks of villages and of the village-level workers in the seven project areas, Nad-i-Ali, Marja, Shamalan, Darweshan, Seraj, Arghandab, and Tarnak. It operates the rural development centers. It integrates the work of agriculture, public health, adult education, home construction, and handicraft specialists with the over-all rural development program.

TRAINING CENTER, conducts a training school for rural development workers under the direction of a training officer.

DIVISION OF SETTLEMENT AND LANDS, Director in charge.

SELECTION AND REGISTRATION, under policies established by the Supreme Council and the Minister of Interior, of new families, including arrangements for the arrival of nomad groups and other settlers, and maintenance of a register of all settlers.

LAND ASSIGNMENT, to settlers, including maintenance of records of all tracts allotted by the HVA.

EQUIPMENT ISSUES AND LOANS, to settlers, including making cash advances and collecting for cost of land, and providing housing materials, equipment and seed.

DIVISION OF AGRICULTURE, Director in charge, in cooperation with the policies of the Ministry of Agriculture, is responsible for the agricultural program of

the Valley. It assigns specialists in agriculture to the block divisions of the rural development program and conducts special agricultural programs. Its experimentation is to provide technical advice to agricultural extension specialists and to provide seeds, breeding stock, small trees and equipment to the people.

AGRICULTURAL EXTENSION, administers programs of agricultural extension and animal husbandry.

EXPERIMENTS, conducts experimentation in horticulture, grain crops and pasture grasses, and maintains a plant and tree nursery.

SOILS, conducts soil studies and maintains a soils laboratory.

SMALL TOOLS AND FARM MACHINERY, conducts a program of designing and introducing improved tools and practical machinery.

DIVISION OF PUBLIC HEALTH, Medical Director in charge, under policies established by the Ministry of Health, provides health services and administers all health facilities. It provides specialists in health services to block divisions of the rural development program.

COMMUNICABLE DISEASE CONTROL, conducts programs to control malaria, typhus, smallpox and other communicable diseases.

SANITARY ENGINEERING AND INSPECTION, conducts sanitation programs in the villages and inspects the sanitary facilities and services of farms.

PUBLIC HEALTH EDUCATION, carries on health education by audio-visual aids and village meetings.

ASSISTANT MEDICAL PRACTITIONERS AND PUBLIC HEALTH NURSES, provide health care limited to elementary external medicine and home services to women and children.

HOSPITAL AND CLINICS, administers hospital at Girishk and clinics at Nad-i-Ali and Lashkar Gah.

TRAINING CENTER, provides training to prepare assistant medical practitioners, public health nurses and sanitarians.

DIVISION OF EDUCATION, Director in charge, under policies established by the Ministry of Education, administers:

PRIMARY AND SECONDARY EDUCATION, for the Helmand Valley.

VOCATIONAL TRAINING, for training skilled workers in special courses.

FUNDAMENTAL EDUCATION FOR WOMEN, a program to be developed, employing wives of HVA staff trained abroad and ICA home economist and health workers.

DEPARTMENT OF ENGINEERING AND CONSTRUCTION, Vice-President in charge, serving as Chief Engineer of HVA. This Office has five divisions to provide all engineering and construction services.

DIVISION OF PLANNING, Director, a Civil Engineer, in charge, is responsible for planning future projects and preparing engineering designs and specifications.

INSPECTION AT MANZEL BAGH DIVISION, inspects construction work of MKA.

DIVISION OF CANALS AND WATER MANAGEMENT, Director, a Civil Engineer, in charge.

OPERATION AND MAINTENANCE, operates all government-owned canals, schedules water distribution, prepares schedules of anticipated requirements, and maintains all irrigation and drainage facilities. It cooperates with groups of farmers in the improvement of canal and lateral opera-

SUMMARY OF RECOMMENDATIONS

The recommendations set forth in the following report are summarized in three sections. The first section includes the kinds of broad action suggested by the basic conclusions presented above, together with those which are regarded as of outstanding and immediate importance. Many of them involve fundamental changes of policy. The second section spells out the specific lines of action needed to implement these basic policies and also presents various other recommendations, a few of which do not call for immediate action, but all of which are regarded as desirable to insure the maximum economic development of the Helmand Valley and the most effective use of available resources. The third section lists the additional ICA staff which should be recruited to assist the Helmand Valley Authority in carrying out its important functions. All of these recommendations are printed in italics in the body of the report, together with the reasoning upon which they are based. Chapter references are given below within parentheses.

MAJOR RECOMMENDATIONS

1. REPHASING OF THE LAND DEVELOPMENT PROGRAM. Development work should immediately be rephased so as to narrow the gap in time between completion of the main irrigation and drainage canals being constructed by MKA and the land leveling and lateral ditch construction being done by ACU. This should be accomplished by postponing to a second phase the development of certain areas or parts of areas and concentrating the forces of both MKA and ACU on the areas retained in the first phase.

Specifically, it is recommended that the Phase I include construction and land development work in the Marja, Shamalan, and upper two-thirds of the Darweshan areas, with limited provision for improving the supply of water to a portion of the Tarnak area. Phase II would cover development of the Seraj area and the lower third of the Darweshan area, and might also include the Tarnak area if and when the water supply for that area has been proven adequate by better conservation or more storage, or by a combination of both. (Chapter X)

2. LAND UTILIZATION. The utilization of Class IV lands of low fertility which require excessive drainage and leaching for the cultivation of small grains and other commercial crops should not be attempted as a general practice in the Helmand Valley. (Chapter III)

3. PARTIAL CONVERSION TO A LIVESTOCK ECONOMY. It is recommended that no further drainage work be done on the low class soils of the old river terraces west of the Helmand River (Nad-i-Ali and Marja areas) beyond completion of the main drains and the experimental work contemplated under the present program. It is further recommended that those parts of these areas found to be unsuitable for annual crops be converted to irrigated pasture and hay and stocked with sheep. (Chapter III)

tion to conserve water and minimize drainage problems created by canal seepage.

DAMS AND WATER DISTRIBUTION, Civil Engineer in charge, operates and maintains all storage dams and related equipment in accordance with program schedules; with the assistance of the Hydrology Division determines the water storage and release programs for the Kajakai and Arghandab dams; and on the basis of requirements furnished by the Power Department and Department of Canal Operation and Maintenance determines the water release program and water retention programs for flood control and annual carry over.

DIVISION OF HYDROLOGY, Hydrologist in charge, maintains records of flow in the Helmand and Arghandab Rivers and their tributaries and determines available water resources from snow fields in the water shed.

AFGHAN CONSTRUCTION UNIT, under a General Superintendent, who is a Civil Engineer, undertakes all new construction of irrigation and drainage facilities, which are not the responsibility of construction contractors, land leveling operations, and the construction of buildings. It will cooperate with the Planning Division of the Department in scheduling and coordinating its work. This Division is composed of four construction sections and one section for vehicular and construction equipment maintenance.

IRRIGATION AND DRAINAGE CANAL CONSTRUCTION.

LAND DEVELOPMENT, for farms and villages.

BUILDING CONSTRUCTION AND MAINTENANCE.

ROAD CONSTRUCTION AND MAINTENANCE.

EQUIPMENT MAINTENANCE.

DIVISION OF LAND SURVEYS, conducts cadastral surveys of land under jurisdiction of the HVA.

DIVISION OF ACCOUNTS AND REPAYMENTS, is responsible for double-entry accounting system to determine costs and maintain budgetary control. It is also responsible for collection of repayments for construction and for water charges. It determines prorated water delivery costs and water tax rates, assesses and collects charges from water users.

DEPARTMENT OF POWER AND INDUSTRY, Vice-President in charge.

DIVISION OF POWER, Electrical Engineer in charge, is responsible for planning with the Department of Engineering and Construction for the installation of power facilities, operating and maintaining power installations, including the scheduling of distribution of power and the maintenance of electrical equipment. It informs the Division of Canals and Water Management of water release requirements.

DIVISION OF INDUSTRY, an Industrial Engineer in charge, promotes industrial development and financial investments in the region, recommends type, size and location of industries, advises industrialists concerning development potentials, principles of management and the availability of electrical power.

DEPARTMENT OF ADMINISTRATION, Director-General, a specialist in public administration and finance, in charge. This officer serves as Comptroller of the HVA. In cooperation with the Ministry of Finance, this Department is responsible for the development of financial policies and controls. It is composed of:

DIVISION OF AUDITS.

AUDITS.

AUDITS OF CONTRACTOR'S ACCOUNTS.

DIVISION OF FINANCE.

ACCOUNTS, maintains central accounts, issues allotments to the officers and makes disbursements for expenditures.

BUDGETS, reviews and compiles budgets.

DISBURSEMENTS, prepares expenditure vouchers.

PAYROLL, prepares payrolls for payment.

DIVISION OF PERSONNEL, develops policies and procedures for employment.

EMPLOYMENT, employs new personnel.

RECORDS AND CLASSIFICATIONS, classifies personnel positions and keeps personnel records.

DIVISION OF PROCUREMENT AND SUPPLY, procures equipment and supplies which are beyond the authority of the various Departments.

DIVISION OF FILES AND TRANSLATIONS, maintains the central files of the HVA and provides translation services.

DIVISION OF TRANSPORTATION.

ADMINISTRATION, provides a central vehicle pool for all passenger cars and light trucks of the HVA, except those operated by the Department of Engineering and Construction.

MAINTENANCE, provides maintenance and replacement of vehicles.

Additional Proposals

GOVERNMENTAL FUNCTIONS. The proposed organization plan does not make any provision for the judicial, police, tax collection, and other functions which are the normal responsibilities of the provincial governments. The exact present and future relationships of the provincial administrations to the HVA remain undecided and unclear at this time. Girishk Province is presently much more clearly identified with the administration of HVA than either Kandahar or Farah Province. *If any of the functions of Girishk Province are to be placed under the direct authority of the HVA, it is recommended that an additional Department of Civil Administration with divisions of Justice, Police, Tax Collection, and so forth, be established and that none of these functions be placed in the Department of Settlement and Rural Development.* The identification of tax collection and police functions with educational and service functions would probably be confusing in the minds of the people and might lead to suspicion as to the motives of the rural development program.

Inasmuch as the health and education programs within the jurisdiction of the Province of Girishk are already closely associated with the HVA, *it is strongly recommended that they remain an integral part of HVA and its over-all program for rural development.*

COMMUNITY COUNCILS. It is suggested later in discussing the plan of operation of the rural development program that full utilization be made of tribal and group councils at the village and block level. *It is recommended that area councils be formed for each project of the HVA and that a representative be elected from each of the seven project areas to form an advisory council to the top administration of the HVA.* The meetings of this council should be held with the co-

operation of the Vice-President in charge of the Department of Settlement and Development, and the council should be recognized as part of the HVA organization.

TRANSPORTATION. A Division of Transportation has been recommended as part of the proposed Department of Administration. Dependable transportation equipment is essential, particularly since the staff must operate over long distances and in remote locations and at high temperatures. *Wearing out of cars and trucks should be anticipated and new equipment ordered in time to arrive at the time replacements are needed.* An automobile service shop should take care of repairs and preventative maintenance as well as greasing and oiling. All cars and trucks, except those used by key officials and those subject to emergency calls, should be in the HVA yards at night. Gasoline rationing procedure should be simplified to permit HVA personnel and equipment to move promptly in case of emergencies.

SUPPLIES. The procedure for obtaining supplies from the warehouse is slow and cumbersome, requiring sometimes two days to obtain all necessary approvals for even small items. *A system is recommended by which supplies are released upon the receipt of a requisition signed by an authorized individual, such as a superintendent or department head, and accounted for at the warehouse by the same requisition.* On the basis of this document, the warehouse man charges out the supplies withdrawn from his stock to the proper account. The requisition relieves him of responsibility for the materials when inventory is taken. This procedure takes a matter of minutes. *Authorization should also be given to department heads to make limited expenditures for supplies not available in the warehouse by issuing purchase orders.* For each purchase, a requisition should be issued and the material charged to the proper account.

BOOKKEEPING. *A uniform system of bookkeeping should be set up, enabling all departments to use the same method although distinctive account numbers should be employed for each department.* This uniform practice would permit flexibility in shifting clerical help from one department to another when required. The double-entry system of bookkeeping as used by the ACU and its Building Department is adequate and functioning well and should be adopted by all operating units of HVA. *Monthly reports of expenditures should be made available to department heads and administrative officers to control expenditures and evaluate the cost of individual jobs and various types of work.* Cost accounts will also be useful in the preparation of budgets and in improving efficiency of operation.

UNDERSTUDIES. *It should be a general policy that each key official have an assistant wherever possible to act in his behalf when he is absent from the project.* This practice would create a pool of trained administrators to fill the new positions to be established as HVA expands.

Chapter VI
HVA CONSTRUCTION AND OPERATION ACTIVITIES

Two units of the present HVA organization are engaged in field activities involving construction, operation and maintenance and overlap to a degree in the use of personnel and equipment. The first is the Afghan Construction Unit (ACU), which is now a part of the Technical Division of the HVA. The second is the Operation and Maintenance section, which is a part of the Engineering Department of the Technical Division. Both units are under the general supervision of the Vice-President in charge of the Technical Division.

AFGHAN CONSTRUCTION UNIT

The ACU was organized in 1954 for the purpose of taking over the land development work which remained to be done in the various project areas after MKA work had been completed. Work of this type is nearly completed in the Nad-i-Ali and Marja areas, has been started in the Shamalan area, and remains to be undertaken in the Darweshan area and in other areas that may be developed later.

The work consists primarily of land leveling, leaching of saline areas after suitable preparation, construction of irrigation laterals and sublaterals, and construction of accumulator and local drains. In addition, the ACU will be called on to undertake improvements of the irrigation and drainage system when authorized by the HVA, such as the concrete lining of ditches or major canal repair work. Other important activities of the ACU are the construction of public buildings and improvements, and the construction and repair of roads within the Valley.

Establishment of ACU

Organization of the ACU was accomplished with the cooperation and assistance of MKA. An initial staff of technical and skilled personnel was transferred by MKA to the new organization together with a substantial amount of construction equipment. Under a contract with the HVA, the MKA undertook to supervise the initial organization and to make monthly examinations and submit monthly reports on progress. A bookkeeping system was set up corresponding to the system employed by MKA.

Financing

By agreement with the U. S. Export-Import Bank, the sum of $3,300,000 was made available to the ACU from 1954 bank loan funds, principally for the purpose of buying suitable equipment for land development work and to finance the salaries of needed foreign supervisory and technical personnel. As of June 30, 1956, $2,-309,500 had been expended or obligated out of these dollar funds, primarily for equipment purchases.

The ACU has adopted a budget calling for a monthly expenditure of $122,840 in all currencies of which $63,900 would be in dollars. The balance available on June 30, 1956, for future expenditures was $1,904,000 in all currencies, including $990,500 in dollars. At the contemplated rate of expenditure, dollar funds will be exhausted in October, 1957.

Personnel

In July of this year the ACU was reported to have 842 employees, including 7 Americans, 13 Filipinos and 5 Italians. The Afghan personnel included 175 laborers, the remainder being administrative employees, superintendents, equipment operators, mechanics, electricians, carpenters, plumbers, and other skilled and semi-skilled workers.

Work Completed to June 30, 1956

During the first year of operations, progress was slow because of lack of sufficient equipment of suitable types and the difficulties of building up and organizing the required staff. It was reported that the last year's work on land development included: land leveling 3,400 acres; farm ditches, 4,500 acres; irrigation sublaterals, 21 kilometers; drainage laterals, 15 kilometers.

Equipment

The additional equipment, which has been ordered through the use of bank loan funds, is expected to arrive in Afghanistan before the end of this year. It was carefully selected to handle the various types of land development work which the ACU is expected to do. It is assumed that the ACU, within a year or two, will take over the construction equipment now being used by MKA on its current contract, since all of this equipment belongs to the Government of Afghanistan and will be released when contract work is finished. Much of it will be extremely useful on land development work and should result in an acceleration of the ACU program.

OPERATION AND MAINTENANCE

The Operation and Maintenance section of the present Department of Engineering of the HVA is responsible for the control and operation of the reservoirs, canals, diversion dams, and canal structures and the maintenance of all irrigation structures and irrigation and drainage canals and ditches.

Personnel

The present headquarters staff is reported to consist of one civil engineer in charge, one superintendent, two secretaries, one warehouseman and one janitor. Three men are assigned to supervise canal operations and varying numbers of laborers are employed on maintenance work and as watchmen at the heads of the canals. In August, 1956, the staff at the Kajakai Dam consisted of one electrician, one assistant, one mechanic, one cook and 48 laborers, and the staff at the Arghan-

dab Dam included one electrician, one assistant and 31 laborers. An Army contingent of 100 soldiers was attached to the HVA for the purpose of guarding the dams and reservoirs. For maintenance work on the canals, 88 laborers were assigned to the Boghra Canal and 23 laborers to the Shamalan Canal.

Equipment

The equipment now assigned to the operation and maintenance section consists of two flat bed trucks, one jeep station wagon, one universal jeep, and an assortment of hand tools. Because of this extremely limited amount of equipment, the maintenance crews have not been able to keep up with some of the needed repair and maintenance work, although this does not apply to the storage dams where in most cases the facilities are being maintained in first-class condition.

In order to assist the HVA in putting the maintenance of the irrigation system on a more current basis, the ICA included in its budget for the fiscal year 1956 the sum of $233,000 to be expended for the purchase of needed additional equipment. Up to July 1st, no decision had been reached as to the items which should be included, and one of the special assignments received from the ICA by the Survey Team was to appraise the condition of the canals and structures of the irrigation system and to recommend immediately a list of the equipment that should be provided. This matter was taken up by the team upon its arrival at Lashkar Gah and on July 26, 1956, after considering two tentative lists that had previously been proposed and after consulting with the HVA staff, a recommended list was forwarded to the Washington office through the office of the ICA Mission in Kabul consisting of the following items:

4	Pick-up trucks, 3/4 ton
6	Dump trucks, 4 cu.yd.
1	Traxcavator, 1-1/2 cu. yd. bucket
1	Tractor, with angle dozer and winch
1	Dragline/shovel, 2-1/2 cu.yd.
1	Tilt-bed trailer, to handle traxcavator or tractor
1	Flat-bed truck, 154-inch wheel base
1	Water pump, 2-inch discharge
1	Portable light plant, 3.5 KW
10	Wheel-barrows, 5 cu.ft.
100	Railroad picks
200	Shovels, long handled.

All of the major units of equipment in the above list are to be supplied with stocks of spare parts.

The order for purchase of the equipment was placed by the ICA on September 26, 1956. Due to the time required for purchase and delivery, the new equipment will not be on the job until some time next year.

In the meantime, it will be necessary for the Operation and Maintenance Section to call on the ACU for any needed services requiring the use of heavy equipment.

Annual Cost

In the 1956-57 budget of the HVA, the present cost of operation and maintenance of the reservoirs and canal systems is stated to be as follows:

Salaries—94 Employees	3 ,042 ,248 Afs.
Kajakai and Arghandab Reservoirs, Expenses	425 ,322 Afs.
Total	3 ,467 ,570 Afs.
Equivalent Cost at official exchange rate	$ 163,000

The HVA budget does not give separately the costs of equipment, supplies, fuel, and incidental expenses chargeable to operation and maintenance of the canal system.

It is estimated by the Survey Team that the cost of operation and maintenance of the reservoir and canal systems on the Helmand River alone (excluding the Arghandab Dam) will be as follows:

Salaries and Wages	$152 ,000
Equipment and Supplies	96 ,000
Total	$248 ,000

This takes into account the additional equipment which the HVA will receive next year and the cost of its operation and maintenance.

The total area being irrigated along the Helmand River from the Kajakai Dam down to the lower end of the Darweshan project is 138,345 acres and consequently the average annual cost of maintenance and operation would be about $1.80 per acre. The total cost will increase as additional land is brought under irrigation, but the cost per acre should remain at about the amount stated.

Reservoir Operation

The two reservoirs are operated and controlled in such manner as to assure irrigation water supplies through the crop growing season. On the Arghandab River, the annual runoff, as previously described, is frequently not much greater than the storage capacity of the reservoir and, consequently, it must be operated in such manner as to fill as soon as possible and to remain full until the heavy demand for irrigation water begins. Little provision can be made for flood control. On the Helmand River, where the runoff is relatively much larger, the reservoir can be operated so as to obtain both irrigation and flood control benefits.

It is recommended that both reservoirs be stocked with edible fish to serve as a basis for additional food supply and recreation.

Use of Kajakai Reservoir for Flood Control

During the period of record, the minimum runoff of the Helmand River was

about 3,600,000 acre feet per year. About 60 percent of the runoff occurs in March, April, and May and in a minimum year would, therefore, be about 2,200,000 acre feet. This is substantially in excess of the live storage capacity of Kajakai Reservoir, which is 1,495,000 acre feet. Consequently, it would appear to be safe to draw the reservoir down during the winter months to a very low level or perhaps to the dead storage level with confidence that sufficient runoff would follow to assure filling by the first of June.

A study of the hydrological records shows that in those years when the runoff was 4 million acre feet or less, floods in the upper part of the river could have been completely controlled, if the suggested manner of operation had been followed. This would benefit those lands along the river which are subject to prolonged overflow and would tend to reduce the erosion of river banks. It would not have much effect on floods in the lower part of the river and in the Chakhansur area due to the fact that several tributaries enter the Helmand River below the Kajakai Dam and many other streams empty into the Chakhansur Basin.

Still further control of floods could be gained at some future time by installing gates on the spillway of the Kajakai Reservoir. This would permit the discharge of the river to be kept below 8,000 second feet in about six out of eight years. As a final possible step, the installation of additional outlet valves at the dam would permit the river to be controlled at a level below 12,000 second feet, even in years when the runoff equalled the maximum flow so far recorded.

Irrigation Deliveries

The Maintenance and Operation Section determines the suitable rate of release of water from the Kajakai and Arghandab Reservoirs to meet irrigation requirements and controls the amount of water to be diverted from the Helmand River into the Boghra Canal. Other canals such as the Seraj, which diverts Helmand River water, and the Patow Canal, which is supplied by the Arghandab River, are operated by their owners without any participation by the Helmand Valley Authority at this time.

Boghra Canal Distribution

Water requirements for lands under the Boghra Canal and its principal lateral, the Shamalan Canal, are determined daily and diversions from the river are made accordingly. Diversions from the main canals into irrigation laterals are controlled by turnout gates, at each of which a watchman is stationed. Ditch riders on the various laterals, usually paid by the farmers, ascertain their water needs each day and pass the information on to the watchman at the turnout gate, who informs the water supervisor on the main canal. The water supervisors patrol the canals once a day and make the necessary adjustments at the turnout gates. Two water supervisors are employed on the Boghra Canal and one on the Shamalan Canal.

Distribution from Laterals

The laterals and sublaterals, in most cases, do not have regular turnout gates, nor do they have measuring devices. Farmers ordinarily use small heads of water, usually varying from 0.5 to 3.0 cubic feet per second. Delivery into farm ditches is usually accomplished by making a cut in the ditch bank or permitting the water to overflow at a low place in the bank protected by rip-rap. There are at present no regulations or restrictions on the use of water other than that it is to be used continuously day and night.

Maintenance of Canal System

The Operation and Maintenance Section has been able to do only such maintenance work as can be performed by hand labor or with the limited equipment available. The result has been that some of the canal banks are showing serious erosion at porous soil areas and below some of the drop structures. In addition, it has not been possible to keep up with the removal of silt deposits in the upper end of the Boghra Canal.

CANAL SILTING. In a upper few miles of the Boghra Canal, silt has been deposited in the bottom of the channel, in some places to a depth of three or four feet. This causes a reduction in the effective capacity of the canal but, for the time being, has not restricted deliveries of ample water supplies to the lands below. During a shut down period of 40 days, beginning in December 1954, the channel was cleared of silt on one side for some distance by making use of a drag-line machine obtained from MKA. This is probably the best means of removing this material and *it is recommended that a similar operation be conducted each year if required to keep the channel clear. Since the equipment being purchased by ICA will not be available during the coming winter, it is recommended that MKA equipment again be obtained for silt removal work.*

In the future, by using the large drag line now on order, the heavy silt deposits can be removed at least in part while the canal is in operation. This may involve the devising of a special type of drag-line bucket, suited to the purpose. *Either during the winter shut down period or, if possible, during periods of canal operation, accumulations of silt should be removed from the canal bottom at drop structures and in the vicinity of lateral turnouts.*

CANAL BANK REPAIRS. In many places the main canals have been built through land containing heavy beds of gypsum and at such places caving of the canal banks is occuring. This tends to increase seepage losses and may endanger the stability of the banks. *At all such locations, the banks should be reinforced by adding such stable soil and rock as can be obtained within a reasonable distance.* When it becomes economically feasible, it may be desirable in the future to line the canals with concrete at some of the points where the worst conditions exist. Such concrete lining could be two inches thick on the sides and three inches thick on the bottom.



Figure 12

Upper End of Boghra Canal, at Low Stage, Showing Silt Deposit on One Side



Figure 13

Erosion of Canal Bank Below a Drop Structure

4. Rural Development. A program of rural development, embracing agricultural extension, public health, and education, should be established and initiated in the new settlements of the Marja area. Staff should be recruited from the HVA agricultural extension workers to become block leaders and from the trainees of the Nad-i-Ali Training Center to become village-level workers. (Chapter VII)

5. Land Settlement Policy. It is recommended that the Afghan Government consider increasing the allocation of land per family for the new settlers in the Helmand Valley and that the size of allocations be based on quality of the soil. Individual farms should be large enough to provide the opportunity to achieve a living standard above the subsistence level, as well as to permit payment of taxes, including assessments for operation and maintenance and payments toward interest and amortization of the project cost. (Chapter VII)

6. HVA Organization. The effectiveness of HVA should be strengthened to enable it to realize as soon as possible its primary goal of assumption of full responsibility for Helmand Valley construction, development, maintenance and operation, and settlement of people on the land. The first essential step is reorganization along functional lines with adequate designation of lines of authority. The second step is the assignment by the Afghan Government of additional employees to the HVA in sufficient numbers to build up its staff to the point where it can fulfill its responsibilities. The third step is a program of training employees both at home and at foreign universities. (Chapter V)

7. ICA Program. The primary objective of the ICA should be the development and prosecution of a realistic and practical program of assistance to the HVA which will enable that organization to take over all aspects of Helmand Valley operations at early specified dates. This will involve the continuance and strengthening of several of the programs now in effect, including assistance in public administration, operation and maintenance, hydrologic investigations, agriculture, rural development, education and training, public health, and the encouragement of industrial and handicraft expansion. In general, the role of ICA technical advisers should be modified to that of consultants and training officers, and their efforts should be directed largely toward the technical guidance of the groups of younger Afghan men who are assuming administrative responsibilities and instructing the farmers in improved agricultural practices. Special programs should be undertaken by contract with appropriate non-governmental agencies whenever possible. (Chapters V and VII)

8. Power Development. A power plant with an initial capacity of 6,400 KW should be installed at the Arghandab Dam as promptly as possible. Immediate steps should be taken to procure and install two 500 KW diesel generators at Kandahar to provide urgently needed power, while the hydro plant is being built, and to supply standby power subsequently. The Kandahar distribution system should be rebuilt so that there can be proper voltage regulation for motors and appli-

RIP RAPPING AT STRUCTURES. *Where erosion of the canal banks has occurred downstream from drop structures, it will be necessary to build up the slopes and apply rip-rap for distances of 100 to 200 feet downstream.* Suitable material such as local conglomerate rock should be quarried in the summer months and hauled to dumps along the canal banks where it could later be placed in the canal with the drag-line equipment. It should be possible to do some of this work while the water is in the canals, but the most successful operation would probably be to place at least the toe of the rip-rap slope when the canal is empty.

RIVER EROSION. There are two or three places along the Helmand River where the river bank has been receding to such an extent that further erosion might endanger the Shamalan Canal. *These places should be carefully watched and measurements taken from time to time to determine how rapidly the recession is taking place and whether the rate of recession is decreasing.* If there is no indication that the river is tending to stabilize its channel, it will be necessary to place rip rap along the bank at the critical locations. This will require large volumes of rock, which should be placed on the slopes out into deep water.

REMOVAL OF MOSS AND WEEDS. At the present time moss and other aquatic weeds are being removed from the canals by laborers working in the water, and this may be the most economical method of doing this work. When more equipment becomes available, a large part of the vegetation can be removed by laying a heavy chain across the canal and then dragging it upstream by means of trucks running slowly on the two canal banks. The moss and weeds so dislodged will float down the canal and can be removed from the banks or at the drop structures by means of bent forks on long poles. A limited amount of vegetation on the slopes of the canal banks is not undesirable as it helps to prevent erosion caused by rainfall. It is important, however, to remove tamarisk, willow or other trees before they grow too large, since their removal thereafter will be costly and may tend to damage the banks.

STRUCTURE INSPECTION AND REPAIR. *All structures, particularly those involving slide gates and other mechanical equipment, should be inspected frequently and repaired promptly.* Careful inspections should be made during periods when the canal is empty so that necessary repairs, greasing and adjustment can be applied to the submerged portions of the structures. Prompt action in correcting and repairing undermining or cracking of the concrete portions of the structures may save many dollars in costly repairs later.

Hydrological Investigations

The hydrological investigations being conducted in the Valley are not under the supervision of the Operations and Maintenance Section but provide valuable information for the control of operation. At the present time, the hydrological work is being directed by two American engineers assigned by the ICA. Afghan employees include 6 field gagers, 18 gage readers and watchmen, and several office



Figure 14

Boghra Canal, Showing Growth of Weeds Along the Bank



Figure 15

Sheep Grazing on Bank of Boghra Canal. Note Growth of Weeds Near Far Side

assistants. Three Afghans, formerly assigned to this work, are now being trained in the United States and are expected to return in the near future. As soon as a qualified civil engineering graduate returns, he should be placed in charge. At the present time, 15 stream gaging stations and 17 climatological stations are being maintained.

The technical assistance provided for the hydrological investigations by the ICA should be continued until Afghan personnel have been trained to the point where they can take over the complete supervision and operation.

General Recommendation on Operation and Maintenance

A thorough inspection of canals and structures and a review of the methods being followed by the present operation and maintenance staff led the Survey Team to conclude that no serious emergency exists at the present time. The canal system has functioned satisfactorily and the deterioration of canal banks and structures has not reached a dangerous point. Furthermore, the existing staff has been augmented by new Afghan engineers with American technical training who are rapidly taking hold of the necessary work.

Consideration was given to the possible desirability of employing a foreign firm to manage the operation and maintenance for a few years and to perfect the training of Afghan personnel during that period. *The Survey Team believes that this is not necessary but does recommend that the ICA recruit and supply an American engineer with experience in irrigation operation and maintenance and in power generation and transmission to serve as a consultant to the Afghan staff.* Until an American engineer with such qualifications can be employed, it will be necessary for the Operation and Maintenance Section to obtain technical advice from the engineers employed by the ACU or from the HVA's technical adviser, or from engineers on the staff of the MKA.

Chapter VII
SETTLEMENT AND SOCIAL DEVELOPMENT

INTRODUCTION

A major purpose of the development of the Helmand Valley is to provide farm homes for nomadic and landless people of the country and to raise the economic and social level of the new settlers in the Valley as well as those who have lived there for many years.

The first organized settlement of new people in the Valley in the past two decades began in 1951 when over 1,000 families were brought from various parts of the country to the Nad-i-Ali project area. Subsequently, the central and provincial governments, with the assistance of ICA, undertook programs of public health and agricultural assistance to aid the new settlers, and these programs were taken over by HVA after it was organized in 1952. The HVA is now operating agricultural and health programs, as well as establishing the first schools in the new villages, and recently has been extending this type of assistance to the older communities. The relationship and interdependency of the agriculture, health, and education programs are becoming more and more clearly recognized, and a broad plan of social development, which will embrace all types of services to the people, is being developed. The first concrete accomplishment toward this end has been the establishment of a training center to teach the multipurpose village-level workers who will be needed for assignment to the broad rural development program.

This chapter opens with a brief account of the people of the Helmand Valley, particularly those in the rural areas, and then outlines the separate programs which have been undertaken for their assistance and education. These include the settlement program, agriculture program, health and sanitation program, education program, and the comprehensive rural development program which integrates all of the various services to the people. The chapter also mentions the need of complete cadastral surveys and offers a suggestion for providing farm credit, both of which are important factors in the successful development of the Valley. At the conclusion of each of the several sections of this chapter, the recommendations applying to the subject are given.

THE PEOPLE OF THE VALLEY

Population

The male population of Kandahar and Girishk provinces in 1956 is officially reported to be 1,116,669. In the absence of a census of females, it can only be assumed that their number would be the same as the males and that the total

population in the two provinces is, therefore, about 2,200,000 persons. The whole of Girishk Province and six districts of Kandahar Province lie within the Helmand Valley development area. The estimated total population of this area is 601,860 persons, 377,628 being in Girishk Province and 224,232 in Kandahar Province. These figures indicate a substantial increase over the 450,000 persons reported previously as living in the Helmand Valley area.

Location of Rural Settlements

The availability of water and the quality of soils originally determined the location of the settlements of the peoples in the Helmand and Arghandab Valleys. The population has been confined to the alluvial flood plains onto which river water can be diverted, except where farmers have been able to tap underground supplies and bring water through tunnels (karezes) and ditches to arable patches of bench land above the river bottoms, or to utilize the seasonal runoff from rolling lands of the desert. The recent construction of the Boghra Canal into the bench lands above the river plain of the Helmand has permitted the first new large permanent settlements in the Valley in historic times.

Old Settlements

THE PEOPLE. Most of the established rural population has lived in the area for an unknown number of years. It seems evident that the people of the Arghandab area and the Valley of the Helmand from the Kajakai Dam to Lashkar Gah are descendents of ancient inhabitants. In the Shamalan and Darweshan areas, Afghan tribes, according to local accounts, have settled within the last 250 years. They probably subordinated villages of small farmers already farming the land and incorporated them into their society as tenant farmers. East of Lashkar Gah and at short distances from the river, small groups from other tribes have arrived in relatively recent years. In the 1930s, a number of Uzbeg families from a Turki-speaking group living in northern Afghanistan were settled by the government at the lower end of the Seraj area.

ECONOMIC STATUS OF OLD SETTLERS. Although the farmers of the established villages appear to have good soils and long experience in agriculture, many appear to be impoverished. There is no information as to how many are independent farmers and how many are tenants. An economic survey recently conducted in three areas along the Helmand River indicated that the average family is composed of eight to nine members. They own, or cultivate under assignment by an owner (the distinction was not made clear), 10 to 15 jiribes of land (5 to 7.5 acres) and obtain a yield of about six bushels of wheat to the acre. The average family owns one cow, one donkey, and a few sheep. Tools are limited to the iron-tipped wooden plow, spade, sickle, and wooden drag. They have no irrigated or dry land pastures on which to graze their livestock which, therefore, must be run on lands left in fallow or on the wheat fields when the grain is first sprouting or after it has been harvested. The area available for livestock grazing has been

reduced as a result of augmented water supply and subsequent increase in double cropping.

The fundamental cause of the impoverishment of the farmers in the established villages appears to lie in the existing social system which permits ownership of the land by a few people and leaves in a position of tenancy the large majority. Under this system, tenants normally receive one-fifth of the grain crop and from one-quarter to one-half of the other crops which they produce on the land assigned to them. Little opportunity exists for tenant farmers to expand their operations or increase their income and any incentive to improve the fertility of their farm assignments is dissipated by the threat of possible reassignment to other land in following years. Crop production is also limited by the inadequacy of the available tools, which controls the amount of land which a farmer can cultivate. Only a few tenants have been able to acquire enough money to buy land or to purchase oxen and plows with which they can cultivate the land of others on a contract basis. An independent farmer who can undertake such work usually receives 50 percent of the crop produced.

THE SOCIAL ORGANIZATION. The present social and economic position of the people of the Helmand Valley appears to be the result of a breakdown of a former tribal system. Through a long period of time the leaders of the tribes which settled in the area acquired personal or family ownership of the lands of the Valley as the tribal organizations tended to dissolve. Through inheritance these lands have become subdivided but a practice of arranged marriages between children of related families of the landed class has tended to keep the property in the hands of the families of the original owners. This practice maintains a solid social class, whose wealth and social ties give them a powerful control over the rural communities.

In the Lower Helmand Valley wide variations of this system exist. In the Garmsel area a few wealthy khans or chiefs own most of the irrigated land and the villagers are entirely subordinate to them. Upstream in the Darweshan and Shamalan areas, a larger number of chiefs own the land. In the latter, live the descendents of three tribal groups whose chiefs own virtually all the privately held land. Individually owned lands have increased as the tribes have become subdivided but sons who have been khans and land owners in their own right still recognize the eldest brother as head of all the people. In the face of any threat to their holdings or to the social control which they exert over their tribesmen and other farmers, these khans join forces to maintain their economic and social system. Furthermore, with the firm and more abundant water supply provided by the Shamalan Canal and with large labor forces available, they have been able to put into permanent production large areas in the project which formerly lay idle three out of four years or were wholly unused. As a result land holdings of the khans in the Shamalan area have increased substantially in recent years.

Above the Shamalan, where the villagers are in a more advantageous position

to take water from the river, there are reported to be a greater number of small land owners, but groups of related families under khans and the system of land owner and tenant worker generally prevails.

In the Arghandab Valley individual and private land ownership has reached the most advanced stage in the Valley. Although the people recall membership in tribal or clan groups, and sections of the Valley are considered to have been areas settled by different tribes, the tribal groupings appear now to be only vestigial and the individual family is the strongest social unit. The influence of an urban society and a provincial government in Kandahar has probably tended to check the power and grouping together of large land owners.

New Settlements

THE PURPOSE. The Government of Afghanistan has realized for some years the desirability of settling the 2 million or more nomadic people who seasonally migrate in and out of the country and have few territorial or social roots. They belong largely to the Pushtu-speaking populations of modern Afghanistan and Pakistan. Their economic situation is deteriorating as the national governments restrict their migration across international borders, thus reducing the informal trading, seasonal wage work, and transportation services which they have carried on for centuries. Their movements through agricultural areas have brought complaints of damage to crops and grazing lands caused by their flocks. Economic and social pressures for several years have led tribal leaders to petition the Government of Afghanistan for lands on which they might settle their people.

SETTLEMENT OF NAD-I-ALI AND MARJA. Since 1951 the Government of Afghanistan has settled 1,330 families in the Nad-i-Ali project, of whom 70 percent were nomads and 30 percent were landless farmers drawn from various parts of the country. It is estimated that 6,650 persons composed the families who settled in that area and that approximately another 3,500 to 4,000 people accompanied them when they arrived. These were relatives and members of the same tribal groups as the settlers and came with them because of close social ties or in the expectation of receiving project lands at a later date.

In the fall of 1956, about 500 families composed of 2,500 to 3,500 new settlers will take up land assignments in three blocks of the Marja project but the exact number is not yet determined.

The people brought into the Nad-i-Ali area were predominantly selected from 21 nomad tribes of which the more important are the Sulaimankhail, Daftany, Achekzai, Baluch, Kharote, Nasir, Kaker, Tokher, Tarak, and Durani. Also included were members of the Bokhara people formerly resident in territories now embraced within the USSR, and a substantial number of landless farm tenants.

The number of nomads who came to the Valley to seek land far exceeded the number of available farms with the result that some families returned to their tribal groups while others took up residence with families fortunate enough to receive homes and land assignments. The early mass immigration was soon

stopped, but it was necessary to place accepted settlers on the land before the character of the soil and the conditions affecting irrigation were understood and before lot boundaries were marked and the land prepared for use. The rush of settlement, without adequate administrative machinery for achieving a controlled settlement program, led to some of the current agricultural and welfare problems of Nad-i-Ali.

FARMING. The great majority of farm families at Nad-i-Ali now work and live under primitive conditions. The production of their farms has reached seriously low levels because of the soil and irrigation problems encountered and actual returns from the newly settled lands are far below original estimates. Farmers are now producing an average of 3,700 pounds of grain from a 13.5 acre farm, whereas in the first year of settlement they were able to harvest 8,100 pounds. In the third year of settlement, it was decided that much of the land should be planted to alfalfa and part of the land now carries this crop.

Most of the families started vegetable gardens and planted fruit trees and grapevines, but some of these plantings have been abandoned because of the salinity that has developed in the soil. Although settlers were instructed to leave behind or sell their livestock, some brought camels and goats with them and then were forced to dispose of them because of restrictions on grazing. Many families have since acquired a cow and a few sheep, but the number of settlers having adequate herds to meet their food requirement forms a small proportion of the total population.

FARMING PROBLEMS. The reduction in crop production is directly attributable to the rising water table that followed the irrigation of the Nad-i-Ali land and the resulting increase in the salinity of the soils. The problem of the farmer has been aggravated by the limited soil fertility and lack of knowledge of proper irrigation methods. More than one-third of the project area is now out of production.

It was originally estimated that Nad-i-Ali would provide an irrigable area of 23,800 acres but this figure was first reduced to 21,000 and then in 1956 to 18,500. The land is being utilized approximately in the following manner at the present time:

Idle	6,155 acres
Fallow	2,645 acres
Wheat	7,025 acres
Alfalfa	2,210 acres
Orchards and Vineyards	300 acres
Pasture	100 acres
Miscellaneous	65 acres
Total	18,500 acres

SUBSISTENCE ECONOMY. Antiquated farming technology and the present low fertility of the soil have forced Nad-i-Ali settlers into a subsistence economy and in many cases extreme impoverishment. Reports vary as to the number of families that have left the project because of failure. Officials report that only 10 to 12 families, including a few families of experienced farmers brought in to become agricultural leaders, have left, while other informants state that several hundred families have been forced to leave. The latter observations may have been influenced by reports of the number of families who were forced to return to their tribes because they did not receive land assignments.

The families now failing to gain a minimum subsistence from their lands constitute a difficult welfare problem for the HVA. In many cases it has been necessary to provide temporary or full-time work or to issue rations of grain. No figures are available as to the number of families that have become dependent on the government nor as to the actual present economic condition of the people, their crop production, land use or income.

PRESENT OUTLOOK. As the discussion of soils and drainage has indicated, little optimism can be held out for the success of continued crop farming on the majority of the land. Only those farmers who have adequately drained lands and Class II or Class III soil and who do some fertilizing are producing market surpluses. Any surpluses are sold to government buyers seeking grain supplies for the army and local police or to merchants from Kandahar, who are paying good prices. Their experience reveals the possibilities of lands with good quality soils. Officials of the Helmand Valley Authority believe that the nomad families who faltered badly in the first year of their attempt to farm have now become reasonably proficient cultivators and have adopted a sedentary life with greater ease and rapidity than was anticipated. However, the majority of the people on Nad-i-Ali now appear to be at a critical point. Conversion of their lands to irrigated pasture and the raising of sheep appear to be their economic salvation.

Success so far among the settlers must be measured in the satisfactions that come with better homes and gardens and a community life that provides fuller social satisfaction and security than found in the nomadic way of life. Furthermore, avenues are open for securing more income and better standards of living through supplementary wage work and handicrafts, improved farming techniques, and the raising of livestock.

The Social Organization

Four villages were originally established in the Nad-i-Ali project. It was the intention of the government to settle nomadic families in them without regard to tribal affiliations but groups of tribal people, belonging to bands of related families under a chief and accustomed to travelling and grazing their flocks together, frequently took up separate portions of villages and maintained their social unity in neighborhoods. A fifth village was later established and settled by members of a single tribe which had roamed in the Helmand Valley.

Members of these tribal groups show a desire to preserve their unity and to work cooperatively under the leadership of their tribal chiefs. Tribalism has not become accentuated, but the traditional social ties of the tribal groups have been preserved to provide security and a basis for group activity. HVA officials find it convenient to work with families that have these group affiliations and established leaders. One village group composed of members of a single tribe has cooperatively farmed land outside the boundaries of the project, under contract with HVA. In another village a split has occurred in one of the tribes and the minority has moved to a new location, where they are establishing a new village and constructing their own houses after electing a new leader and taking up new farm land. One small nomadic group, not originally intended to be settled in the project, has been allowed to take up a small area of farm land and to establish its camp outside of the project area.

Experience has shown that communities and neighborhoods of families of single tribes have not set themselves apart or introduced undue discord into the society of Nad-i-Ali. Tribal groups have, on the other hand, provided social control through their own leaders. Some families following the traditional pattern of living in the joint family groupings of a nomad camp have taken over complete four-family houses, and live and eat together as a single group, although the majority of families have preferred to occupy individual quarters but live in neighborhoods close to relatives.

No village organizations cross-cutting tribal lines have yet appeared. Tribal groups and tenant farmers who came to the project without traditional chiefs have since elected their own leaders. These leaders and the tribal chiefs meet with the headmen of individual families to discuss group affairs and problems to be taken up with the administration of the HVA. Such community councils are not yet officially recognized or extensively used by HVA or ICA personnel as media for stimulating local self-help programs and village organizations.

Each tribal group has been permitted by HVA to elect two representatives to a Nad-i-Ali advisory council. The representatives, called "wakils," are usually recognized chiefs or natural leaders. The wakils of the 21 tribal units meet from time to time with the HVA Vice-President in charge of Agriculture and Settlement to present the problems of their groups and make petitions for assistance.

SOCIAL CHANGE. The social structure of the Nad-i-Ali population still remains flexible and is in process of change. There is a tendency for members of a tribe who are related by blood as well as bound by traditional association to live and act together and accept leadership of the man who brought them to the project. Tribal groups under chiefs who are democratically minded and who work actively in the interest of their people have reinforced their tribal solidarity. Where the chief has become dominating or has attempted to coerce tribal members to work his lands and serve his personal interests, the tribal group has split. Individual ownership of land now provides an opportunity to live independently which did not exist under a nomadic way of life but families that have withdrawn from their

ances. This should be done while the power plant is under construction. (Chapter VIII)

9. INDUSTRY. (Chapter VIII) Major industrial development should include:

a. Establishment of a fruit research center at Kandahar by the government as recommended in the report prepared by Mr. A. H. Sabin and submitted to the government in 1948.

b. Prompt reorganization and rehabilitation of the Kandahar Woolen Mill.

c. Establishment of a modern tannery in the Kandahar region.

d. Establishment of a sugar mill in the Lashkar Gah region with an initial capacity of about 40 tons per day. HVA should take steps to divert the necessary acreage to sugar beet production.

10. ROADS. The road from Kandahar to Kabul should be improved to make it an all-weather and all-year road when traffic volume increases and resources permit. (Chapter VIII)

11. IN-TRANSIT FACILITIES THROUGH PAKISTAN. In view of the importance of transportation facilities in the development of the Helmand Valley, it is recommended that efforts be made to work out an in-transit trade agreement with Pakistan which might include a bonded warehouse in Karachi and a spur over the border at Spin Baldak with necessary storage and handling facilities. (Chapter IX)

OTHER RECOMMENDATIONS

12. SOILS AND AGRICULTURE. (Chapter III)

a. Advice and instruction should be given to farmers of the Valley in methods of planting, irrigating, harvesting, and fertilizing crops, and in the hand digging of farm drains.

b. Tile, rather than open, drains should be constructed on good quality lands. Investigations should be continued to determine the efficiency and necessary spacing of tile and open drains on lands to be put into crops in the Marja area.

c. Careful consideration should be given to the amounts of soluble salt and boron remaining in soils which produce poor crops after leaching and to the cost of reclamation of alkaline soils. Settlement of farmers on alkaline soils should be avoided.

d. Livestock should be improved through a program of selection of native animals, and experimentation in sheep breeding to improve the quality of meat and fiber should be continued.

e. Consultation should be held with UN-FAO on the feasibility of planting semi-tropical fruits and other crops suited to commercial and industrial purposes. Experiments should be conducted to determine the best grasses for seeding of pasture lands. Experiments in salt tolerance of crops

traditional tribal units to settle in the project nevertheless realign themselves in new tribal subgroups for security and for close social intercourse.

Families of the former landless people, under stress of establishing their new farms, tend to become more individualistic and to turn directly to government officials for support in time of need and seem to feel little necessity for group action. Among all of the families baffled by the difficulties of making a living on the project, there appears to be an increasing tendency to develop an over-dependency on local government leadership and toward loss of their natural self-reliance. It must also be added that family and intertribal relations and friendliness are increasing.

Urban Communities

The two urban communities of the area are the City of Kandahar, capital of Kandahar Province, numbering about 50,000 persons, and Girishk, a town of about 8,000 people and the present seat of the Girishk provincial government. Kandahar is the industrial and market center of southern Afghanistan and the point of export for the agricultural and processed products of the Arghandab and Helmand Valleys. It also serves as the transportation and communications center. The plans of the Government of Afghanistan, with ICA help, to complete construction of an international airport 14 miles from the city, and the interest of the citizens in expanding industrial plants, as well as the anticipated increase of raw materials from the Helmand Valley, indicate that Kandahar will grow in size and importance.

Lashkar Gah is the headquarters of the Helmand Valley Authority and the ICA staff in the Helmand region. It is a new town, recently constructed on bench land above the Helmand River, with modern residences and quarters for personnel, an office building and staff house, and a community center. It is the only town in Afghanistan that has a pure water supply and a modern sewage system. A small bazaar has developed along the river frontage. The Central Bank of Afghanistan has opened a branch office, and a permanent bank building and a large mosque are under construction. Plans call for the building of a hospital, a public school, and an HVA office building. The headquarters of Girishk Province are to be moved from Girishk to Lashkar Gah in the near future.

SETTLEMENT PROGRAM

A primary purpose of the Valley development program is to provide farms for a portion of the 2 million nomads in the country. The present settlement of 930 nomad families in Nad-i-Ali and the proposed settlement of 500 families in Marja are significant as being the first attempt to make farmers out of nomads. Officials of the Government of Afghanistan appear confident that nomads will become successful settlers on new land. Experience elsewhere reflects the difficulty of conquering new land even with experienced farmers. To many people, therefore, the Afghan land settlement program is regarded as a bold experiment.

It has been the policy to distribute the new land among as many tribes as possible and 21 tribes are now represented in the population of Nad-i-Ali. The Prime Minister has the responsibility for designating the tribes which are to send people for settlement, and the Ministry of Interior selects the families and arranges for their arrival. HVA has requested that it be given a free hand in the selection of settlers and their rate of arrival, but is still required to receive directions and accept the terms of settlement from the Supreme Council of the Cabinet.

Although priority is given to nomads, a portion of the land is made available to deserving tenant farmers, with the hope that their experience in farming will have a beneficial effect upon the nomad settlers. They are brought from different regions of the country in order to gain nationwide support of the development program and to prevent feelings of regionalism or suspicion of favoritism. About 400 landless farm families were settled in the Nad-i-Ali area bringing the total population, including the nomads, to about 1,330 families.

Settlement of Nad-i-Ali Project

Each of the families settled on Nad-i-Ali received property valued at the following amounts in afghanis.

Land	9,000 Afs.
House	12,000 Afs.
Farm Animals, Equipment and Seed	5,000 Afs.
Cash Advance (non-reimbursable)	1,000 Afs.

All allotments were made on a 15-acre basis and valued at 600 afghanis per acre. Thirteen and one-half acres of land were allocated for farming and the balance of 1½ acres for a house and garden in the neighborhood village. The cost of the land is to be repaid within 20 years, without interest. The village houses were built by HVA to accommodate four families, but settlers have been allowed to take over more than one family section if they wanted to assume the additional cost.

Settlers were at first advanced 5,000 afghanis to purchase one ox, one cow, one donkey, one plow, one yoke, one drag, one spade and one sickle, and also to purchase 450 pounds of wheat, 90 pounds of barley, and 20 pounds of alfalfa seed. As the original seed allowance proved to be inadequate, the purchase of the cow and donkey was eliminated to compensate for the extra seed cost. It was expected that settlers would be able to purchase the cow and donkey later out of the returns from the sale of their first harvest. The cost of the house and the loan for animals, equipment and seed grain are to be repaid in 25 years without interest. Since the settlement of the first group of families, the HVA has assigned an additional half acre of land outside of the project area to every adult male for use as a wood lot.

The amount of land to be assigned to a family was a subject of controversy

from the beginning. The original considerations were the number of families to be settled, the amount of new land available, the quality of the soil, the type of farming to be adopted, and the number of persons in each family. The first ICA technical advisers in the Valley recommended that 25-acre farms be assigned to settlers. MKA strongly urged that size of farms should be related to the quality of the soil, the poorest lands to be divided into the largest units, and the better lands into smaller units, and each unit to be of a size which could be profitably farmed by one family.

In the Nad-i-Ali area, the size of farm finally adopted was based on land classes but limited by the amount of land which a farmer could cultivate, considered to be from 10 to 15 acres, and also by the size of farms being cultivated in other parts of the country. Land allotments were originally to be made on the basis of a preliminary land classification, consisting of three classes, A, B, and C. The allotment was to be 10 acres of Class A land, 12.5 acres of Class B land, or 15 acres of Class C land. Subsequently, the whole area was declared to be Class C, which was later redesignated as Class IV, and it was decided to allot a uniform 15 acres to each family.

Settlement of the Marja Project

The experience of the HVA in settling people on the Nad-i-Ali project demonstrated the desirability of a sliding scale of sizes for family unit farms based on the productivity of the land, and the present official policy is to assign 7.5 acres of Class I land, 10 acres of Class II, 12.5 acres of Class III, or 15 acres of Class IV.

Experience has also shown that there must be a larger allowance of grain for food to maintain a family until the first crop can be harvested and that, if the lands are not to be cultivated and planted with power equipment as originally contemplated by HVA, it will be necessary that new settlers receive seed, an ox and farm tools so they can commence farm operations immediately upon arrival. The crop returns of the Nad-i-Ali farmers to date have also indicated that the schedule of repayment of the cost of land, house and equipment probably cannot be met. Expenditures for houses and equipment are, therefore, to be reduced in the case of the arriving settlers on the Marja project. The government has also been unwilling or unable to make the same cash advances and seed allowances that were given to the Nad-i-Ali families. The settlers on the Marja project this fall will receive the following assistance:

Land Value (average)	7,500 Afs.
Housing Material	5,000 Afs.
Ox and Farming Equipment	3,000 Afs.
Cash Advance (non-reimbursable)	500 Afs.
Wheat for Food	500 Pounds.

Seed to be issued according to quality of the soil.

A value of 800 afghanis per acre was established for Class II land, 600 afghanis per acre for Class III land, and 400 afghanis per acre for Class IV land, but the settlers are to be charged a uniform 500 afghanis per acre. HVA will not build homes for settlers but will provide doors, windows and lumber up to the value of 5,000 Afs. and will assist in the building of houses of sun-dried brick in accordance with approved plans.

HVA has been growing wheat and alfalfa on out-of-project lands, under contract with local farmers, to provide the necessary seed and the additional grain required for feeding the new settlers. If shortages are faced during the first year of the Marja settlement, HVA plans to make emergency loans from its current operating budget.

MARJA VILLAGES. To accommodate the first 500 families in the Marja project, HVA is planning villages for groups of about 40 families, so that they will live nearer their farms than was the case in Nad-i-Ali. The houses in each village will be in two widely separated rows and between them will be the village center for a primary school, a community meeting place, a well and a small mosque or a raised-earth platform for daily prayers. The home of the assigned village-level worker will be built in the village center.

After the settlers have built their own homes, they will be encouraged to build the school house, meeting place, and mosque. It was suggested by the Survey Team that a community bath and laundry be also built in each village, following the construction plans worked out by the Near East Foundation for villages in Iran.

At a major cross road within reach of 20 to 30 villages, a block center will be constructed to serve as headquarters of the block leader of the Rural Development Division and his technical specialists and to accommodate a secondary school, health center, large mosque, and bazaar.

The Supreme Council has recommended that the members of different tribes be mixed in the Marja villages as a means of lessening tribal factionalism. As described previously, experience at Nad-i-Ali has already demonstrated that settlement of villages by tribal groups has provided more advantages than disadvantages. HVA believes that tribal villages are more satisfactory from an administrative as well as a social point of view because the functioning tribal leadership and councils serve as a ready-made means of organizing the people for group action and communication.

Recommendations on Settlement Program

The Survey Team supports the HVA plan of settlement of villages by tribal groups and recommends that the HVA give full support to community and tribal councils as a means of continuing community stability and as a medium for introducing the rural development program.

It is also recommended that larger farms than now contemplated be assigned to farm families and that size be suitably related to soil quality.

AGRICULTURE PROGRAM

In addition to direct assistance in providing farm tools and seed as described previously, the Division of Agriculture has been providing agricultural extension service to settlers. Between 1952 and 1955, a number of graduates of the Vocational Agriculture School in Kabul were brought to the Helmand Valley and trained in extension work by ICA advisers. They have since been placed in the villages of Nad-i-Ali to give instruction in farming methods and to interest farmers in planting various new crops and vegetables. Their work is proving effective in helping the nomads to adapt to their new way of earning a livelihood.

Experimental Projects

The ICA has cooperated with the Department of Agriculture in four experimental projects to bring about improvements in the agriculture of the Valley.

The first is a livestock-breeding program which has produced few practical results so far. Brown Swiss cattle and Columbia sheep have been imported from the United States and poultry from Iran in an attempt to improve the native stock by cross-breeding. For various reasons cross-breeding of the Swiss cattle has not been successful. Furthermore, the imported animals require more and better feed than would normally be available and have been susceptible to many diseases. The native stock might be improved by selective breeding and is already well adapted to local conditions and thrives on the sparse range land, poor pastures and grain stubble. The sheep are efficient meat and fat producers and furnish valuable wool, skins and milk. Native cattle are not good milk producers, but do furnish hides and low-quality meat. They are used largely as work animals. *Experimental selective breeding of native cattle and sheep should be continued.*

The second project, experimental work in agriculture, is directed by the University of Wyoming under contract with ICA. It involves experiments in agronomy, irrigation, horticulture and livestock, mostly done in the vicinity of Kabul. In the Helmand Valley, the University is establishing an experimental farm and is in the process of preparing the land by leveling and leaching. This project has desirable long-range objectives but is not designed to meet the most pressing agricultural needs of the country and particularly those of the Helmand Valley. For example, use is made of materials, practices and mechanized equipment which will probably not be available to farmers for decades to come; considerable effort is directed to variety testing of crops not generally grown; and much of the irrigation work is designed to demonstrate that furrow irrigation is superior to the almost universally used basin irrigation, while little is being done to improve soil-water-plant relations and irrigation efficiency under the existing system.

The ICA's experimental project in agriculture involves a little seed-increase work and the raising of vegetables in a horticultural experiment, the produce being used for local consumption. This project is not aiding in the solution of the important problems of the Valley or in training Afghan agriculturists.

The fourth project is a tree nursery program which has merit in attempting to provide fuel, lumber, windbreaks and shade, but its accomplishments to date are a bare 50 percent production from seedlings. Considerable plant loss is suffered because of the careless methods employed by settlers in transplanting young stock from the nursery.

Advisory Services

The technical advisory services of the six ICA agriculturists now in the Valley are directed almost exclusively to officials of the HVA. The advice is planned to be in the fields of agronomy and soil management, horticulture, farm irrigation, animal husbandry, forestry, and land development, and thus covers the entire field of agriculture quite comprehensively. However, due to the scarcity of trained agriculturists on the HVA staff, most of the effective agricultural advice of the six ICA specialists must, of necessity, be directed to two persons, the HVA Director of Agriculture, who incidentally has a Ph.D. in Agriculture, and his assistant, whose time is largely absorbed in the administration of the Nad-i-Ali and Marja settlement programs. In connection with the experimental projects, the advisory service to HVA personnel is almost entirely wasted due to the fact that the HVA, of necessity, must assign non-English speaking and untrained assistants as counterparts.

Recommendations on Agriculture Program

It is recommended that the counterpart system in Afghanistan, and particularly in the Helmand Valley, be critically examined. Until the HVA is much more completely staffed with trained personnel, who can serve as qualified counterparts to receive advice, *the work of the technical advisors should place more emphasis on the actual instructing of Afghan trainees and junior HVA staff members and less emphasis on the constant consulting with the few overworked HVA officials.*

For example, these ICA technical advisers could probably give all the technical advice that is needed by HVA officials in about five hours a week. The balance of their time could well be spent in actually teaching classes of carefully chosen young men of Helmand Valley the basic principles of agronomy, animal husbandry, irrigation, agricultural engineering and allied subjects so that these young men could themselves become well informed advisers and instructors to the farmers.

HEALTH AND SANITATION PROGRAM

Public health and sanitation have been recognized as essential parts of the Valley development since the inception of HVA. The public health officer, who serves as director of the HVA Health and Sanitation Department, is a public health bacteriologist, trained in the United States. He was appointed by the Minister of Health of the Central Government but makes his headquarters at Lashkar Gah where he serves as counterpart of the ICA medical advisers.

Services Being Rendered

Medical and sanitation services of several kinds are being performed as follows:

NAD-I-ALI INFIRMARY. One physician and a male nurse conduct an outpatient clinic and temporary infirmary of five beds. The physician also holds a clinic at the HVA health office in Lashkar Gah which is regularly staffed by an administrative assistant and a male nurse.

MALARIAL CONTROL AND NURSING. Two specialists are assigned to this work and, in addition, one supervises sanitary conditions and garbage disposal at Lashkar Gah and the other gives smallpox innoculations.

NAWA DISTRICT IN THE SHAMALAN AREA. One sanitarian is assigned to carry on a public health education program.

NAD-I-ALI TRAINING CENTER. A sanitarian is assigned to teach health measures.

GIRISHK HOSPITAL. This hospital has recently been incorporated in the Health and Sanitation Department of HVA. The staff consists of two physicians, a laboratory clinician, a pharmacist, and four male nurses.

MOTION PICTURE PROGRAM. A health educator, trained at the American University of Beirut, conducts motion picture and lecture programs in the villages.

HEALTH CAMPAIGNS. The Health and Sanitation Department has actively participated in the health programs of the Ministry of Health. During 1955 in the area between Kajakai Dam and the Lower Darweshan, 137,000 people were reached through the spraying of houses with DDT, 157,000 people received DDT dusting against typhus-bearing lice, and 25,000 were vaccinated against smallpox. These programs are being continued in 1956.

ICA Technical Assistance

The ICA technical assistance program in public health in the Helmand Valley is based on a plan recommended some time ago by a joint committee of HVA, Ministry of Health, and ICA representatives. This program included communicable disease control, environmental sanitation, public health nursing, health education, maternal and child help, a public health laboratory, and the establishment of a health statistics service. Because of lack of public health personnel, ICA participation has been sporadic and is currently suspended, except for the provision of some supplies and equipment. A sanitation program to build latrines and educate the nomad settlers in their use has been started, and four groups of latrines now stand in the villages of Nad-i-Ali as a demonstration. A well-drilling machine has been purchased, but inability to recruit or contract for an operator, has resulted in this project being inoperative. A plan was prepared for a sanitary food market at Lashkar Gah but, its purpose not being fully comprehended, was not accepted by the bazaar merchants.

Health Training

Refresher courses were given to sanitarians employed by the Ministry of

Health during the periods when health officers were on the ICA staff. The Training Center at Nad-i-Ali now utilizes the curricula and public health practices for village-level workers which was prepared by the physician formerly attending the ICA staff in the Helmand Valley. Under the ICA's program, Afghans are in training in Iran and at the American University of Beirut to become public health specialists in the Helmand Valley rural development program.

Equipment

Two mobile clinic automobiles have been purchased for the health program, but staff has not been available to utilize them. Their value has been greatly circumscribed by the difficulty of operating them in crowds of persistent villagers seeking treatment. Adequate equipment is on hand for a good audio-visual program in health education, but HVA is presently without a trained operator. The motion picture films on hand have been shown several times in the villages of the Nad-i-Ali and no longer attract any interest. No way has been devised to show the pictures to village women, and it has been impossible to show them in many of the villages of the Helmand Valley because of the absence of access roads for transporting the equipment. ICA continues to supply DDT and transportation equipment for the Valley malarial and typhus campaigns.

The construction and equipping of a public health center at Girishk remains uncompleted because of the pressure upon the Afghan Construction Unit to fulfill other building commitments. The two hospital physicians assigned there are completely occupied in medical treatment and surgery and have little opportunity for conducting a public health program.

Health of the People

The incidence of diseases in the Helmand Valley remains unknown. Malaria reportedly affects a very large part of the population. Typhus reached epidemic proportions once within the last 10 years. People still suffer discomfort from body lice if the eagerness with which they seek DDT dusting can be counted as an indication. The villagers are without community baths and bathing is limited to washing in the irrigation ditches or sponging in the home. Trachoma is seen in nearly every village. Venereal diseases are considered to be very prevalent and forms of enteric diseases are probably universal, especially among children. Villages are without potable water supplies and sanitary latrines. Smallpox has received the attention of the Ministry of Health campaigns, but defective vaccines and difficulty in reaching some villages has handicapped the program and created some loss of confidence in vaccination among the people. Many primitive and magical cures are still practiced among the illiterate population.

From every indication the health conditions in the Helmand Valley constitute a primary problem that causes not only an unnecessary high rate of suffering and mortality, but also sharply reduces the ability of farmers to feed and support their families. Great need exists for an accurate evaluation of the incidence of these communicable diseases among the people of the Helmand Valley and ex-

pansion of controls to curb them. A health education program, which encompasses a thorough knowledge of the existing customs in controlling and treating disease and the concepts held concerning the causes, needs intensification and integration in the rural development program. Facilities for medical services for a central hospital and public health center and for community clinics are also greatly needed.

The few physicians in the Helmand Valley are making a valiant effort to meet the tremendous demands of the people. Yet the female population remains almost totally unattended. The new Faculty of Medicine at Kabul is training the largest single group of high school graduates entering college, but their services will not be available for another three or four years. It will be many years before there is a sufficient supply of physicians for all the major rural areas of the country. The World Health Organization is providing valuable technical assistance in communicable disease control and providing a demonstration of specialized services for a rural community. A Russian health team has just surveyed medical facilities at Kabul with a view to increasing technical assistance in the field of medicine. The majority of the people of the country remain without medical and health facilities, and possibilities and rewards of a wide public health program are infinite.

Recommendations on Health Program

PUBLIC HEALTH TEAM ON CONTRACT BASIS. The public health program in the Helmand Valley requires immediate reactivation and increased support. In view of the difficulty of filling the position of Public Health Adviser in Kabul and those of Public Health Nurse and Sanitarian in the Helmand Valley, *it is recommended that ICA contract with an American school of public health to take over the public health program.* The school should provide a directing physician, a sanitary engineer, a public health nurse, and a health educator. The entire team should be stationed in the Valley. In cooperation with the health division of HVA and the Ministry of Health, its functions would be to conduct a survey of the incidence and causes of communicable diseases and the development of a control program. It should provide the training of village midwives and the teaching of village women in child care and home sanitation and should cover the development of a health education program and the training of sanitarians to participate in the promotion of purer water supplies, latrine construction, design and building of community baths, and other village sanitation activities in the rural development program.

The director of the public health team would serve in the capacity of ICA public health adviser and as a consultant to the Ministry of Health in formulating national public health programs and relating it to the program in the Helmand Valley. Since the present Minister of Health is an experienced medical officer, highly trained in American colleges of medicine and public health, it is believed that the ICA public health adviser could devote most of his time and effort to the direction of the Helmand Valley health program.

HOSPITAL. *It is also recommended that a central hospital, providing a wing for women patients and a public health center, be built at Lashkar Gah.* The plan

should include a center for the training of sanitarians to serve in the rural development program. In planning this center, consideration should be given to the possible desirability of deferring the completion of the auxiliary public health center now under construction at Girishk. At this location, engineering difficulties, costs of operation, and the difficulty of obtaining a public health staff have been such that deferment until after the Lashkar Gah medical center is built and functioning might produce the quickest over-all results.

ASSISTANT MEDICAL PRACTITIONERS. Medical service by professionally trained physicians to all the village people in Afghanistan will not be realized for many years, but male nurses and sanitarians are now practicing a limited amount of elementary medical treatment in rural communities. *It is recommended that the ICA Public Health Division study the programs for utilizing native medical practitioners and assistant physicians, such as those now carried on for many years and with great success in some Middle Eastern countries and also in the Islands of the South Seas.* Training centers for this type of medical worker exist in the Fiji Islands and Indonesia. If such a program is found advisable for Afghanistan, a proposal should be made to the government to initiate the training of native medical practitioners. The school for sanitarians and the hospital at Lashkar Gah would provide an excellent center for this purpose.

EDUCATION PROGRAM

An HVA education department has not yet been organized, but the educational needs in the Valley are fully appreciated.

A study of the enrollment of school children made by the ICA Educational Adviser reveals the striking educational problems of the area. Only 619 children are presently enrolled in Kandahar Province, of whom 298 are in the sixth and only 21 in the twelfth grade. In Farah Province schools, 262 are enrolled in the sixth and 11 in the ninth grade. No senior high school has as yet been provided. Girishk schools provide only an elementary education and only 72 students are presently attending sixth grade. In these three provinces, only a minute fraction of the children of school age are attending school and among them there appears a great mortality in the school attendance after the sixth grade. Little evidence exists that many of the young people who have completed this grade are utilizing their education. The need is great for their training in vocational skills to supply the local demand for skilled workers and to advance their economic position. Those young people who have returned from school to the rural villages would benefit greatly by participation in youth group programs similar to the American 4-H Club activities.

New Local Schools

A school program within the jurisdiction of the HVA to overcome the estimated 98 percent illiteracy of the population is just beginning. In response to the demands of communities in the Nad-i-Ali project, a few schools have been started. Local religious leaders (mullahs), who are literate and traditionally train children

should be terminated and needed information obtained from the U. S. Salinity Laboratory at Riverside, California.

f. Nitrogen fertilizer costing about $500,000 should be imported over a 5-year period. Demonstration of its use should be made on 5-to 10-acre plots in 100 to 200 villages in the first year and expanded in the second. During and following these demonstrations, applications should be made on 1,000 acres the first year and then on areas of 5,000, 10,000, 20,000 and 40,000 acres in successive years. After the second year, the project should be self-supporting through the improved returns from agricultural production.

g. Weed eradication experiments and demonstrations should be undertaken.

h. A study should be made of the whole technology of Afghan farming, and a set of practical and obtainable farm implements should be devised for more effective farm operations.

i. A simple power takeoff should be designed for the operation of flour mills at drops in the main canals.

13. HELMAND VALLEY AUTHORITY ORGANIZATION AND ADMINISTRATION. (Chapter V)

a. The HVA should be reorganized on a basis in which the related functions of (1) settlement and development, (2) engineering, (3) power and industry, and (4) administration would be placed in separate departments.

b. If governmental functions are to be accepted by HVA, these should be placed in a separate Department of Civil Administration.

c. Advisory councils of representatives of the people of each project should be recognized by the HVA in planning and administration.

d. In order to insure adequate transport at all times, replacements of HVA equipment should be ordered on a schedule which will insure their arrival before worn-out equipment must be retired.

e. HVA operating procedures should be simplified. The gasoline rationing regulations should be modified to permit prompt use of transport equipment when emergencies arise. Warehouse requisitioning procedure should be greatly simplified. A uniform system of bookkeeping should be introduced in all departments.

14. CONSTRUCTION AND OPERATION ACTIVITIES. (Chapter VI)

a. The Operation and Maintenance Department of the HVA should develop a plan for operation of reservoirs, canals and laterals, and a definite program for regular inspection and maintenance of canals and structures.

b. Reservoir releases should be carefully planned and coordinated with irrigation requirements. In addition, the Kajakai reservoir should be regulated in such manner as to provide storage capacity for flood-control purposes during the spring runoff period.

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PREPARED FOR

INTERNATIONAL COOPERATION ADMINISTRATION

REPORT ON

DEVELOPMENT OF HELMAND VALLEY

AFGHANISTAN

TUDOR ENGINEERING COMPANY, WASHINGTON, D. C.

NOVEMBER 1956

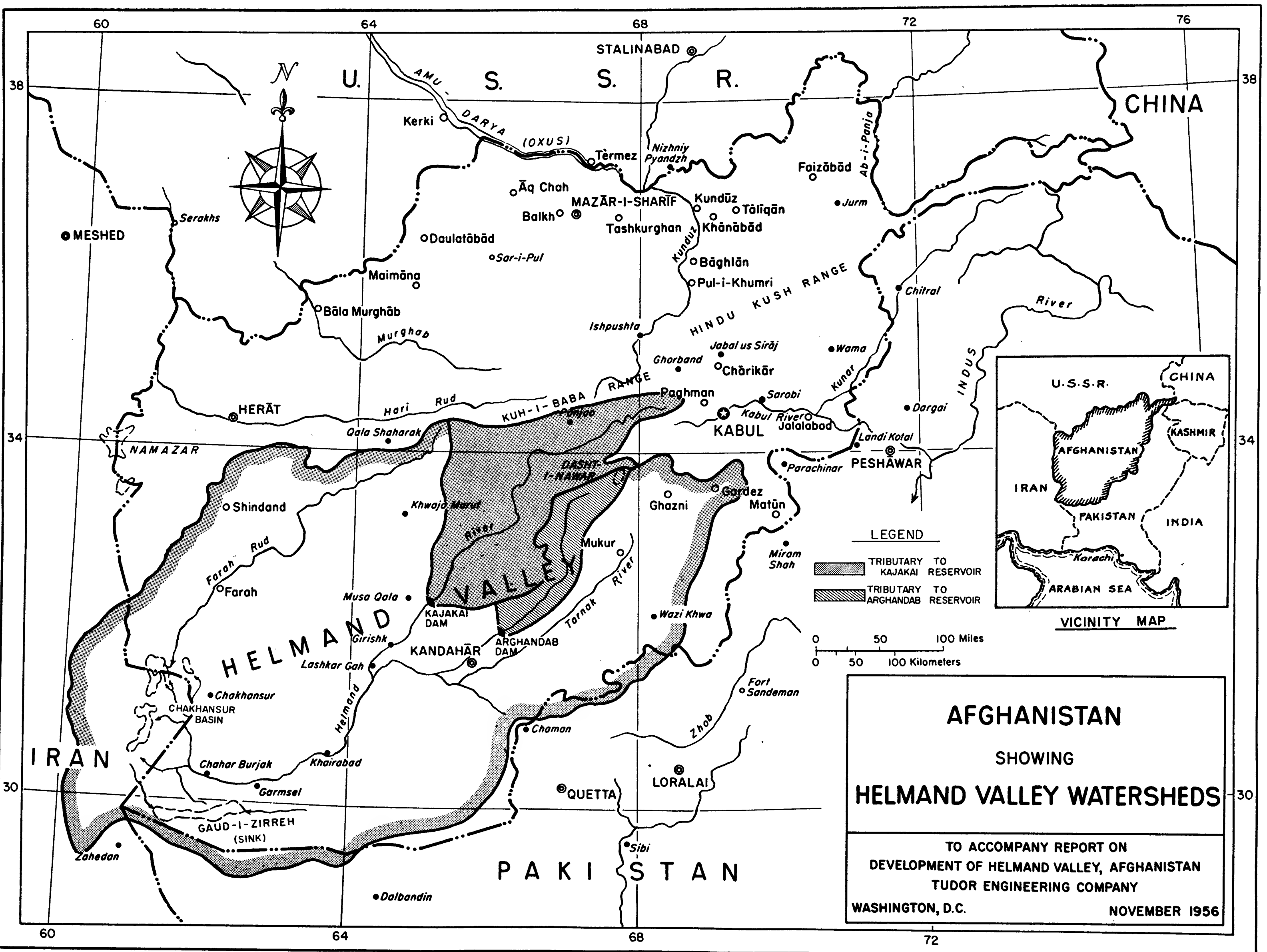


Plate I

Frontispiece

RALPH A. TUDOR
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International Cooperation Administration
815 Connecticut Avenue, N. W.
Washington 25, D. C.

Reference
TEC-2

SUBJECT: Development of Helmand Valley-Afghanistan

Gentlemen:

We are pleased to submit herewith a report on the Development of the Helmand Valley in Afghanistan, which has been prepared pursuant to our contract for engineering services and particularly Amendment No. 2 thereof dated June 26, 1956.

The current program of providing a supply of irrigation water to newly developed lands and a supplemental supply to lands which have long been cultivated was initiated by the Government of Afghanistan in 1946. This program has already produced an estimated average additional gross income in the Upper Helmand Valley of nearly $10,000,000 per year (calculated at the official rate of exchange). It is estimated that, with the completion of the program of development proposed in this report, the additional gross income will increase to about $21,000,000 per year within the next six to eight years.

We consider that general progress in the Helmand Valley is already proof of substantial benefit to the nation. There has been some disappointment that it has not been more rapid and spectacular in its demonstrated benefits but, in large measure, this is because in many instances unrealistic expectations were entertained. It has been the invariable experience with comparable reclamation projects in the United States that time is an essential element in the ultimate and full success of such developments. The Helmand Valley development can be no exception.

We believe that experience so far has demonstrated that the current development program should be modified and that some changes in land utilization should be made, if the earliest and best results are to be obtained. In particular there should be a rescheduling of work so that development of the land does not lag seriously behind the delivery of water. We believe that more effective emphasis should be placed on the training and equipping of the individual farmers. If these and other recommendations contained in the report are carried out, we are confident that the Helmand Valley development will prove of great and lasting benefit to Afghanistan.

The report is the work of a team of seven men drawn from various fields as follows: Governor Leonard B. Jordan, Team Leader; Ralph G. Wadsworth, Civil Engineer and Assistant Team Leader; Clifford E. Plummer, Chief Engineer, Modesto Irrigation District, California; Milton Fireman, Soils Specialist; Gordon Macgregor, Rural Development Specialist; J. Robert Fluker, Economist; and Saul Nelson, Industrial Economist. Frank A. Smonskey, Jr. served as Reporter and Secretary. All were provided by Tudor Engineering Company, except Mr. Fluker, Economic Counselor of the U. S. Embassy, New Delhi, India, whose services were obtained on a loan basis through the International Cooperation Administration. A summary of the experience and qualifications of team members will be found in Appendix I attached to the report.

The report is based on a thorough study of written material on the Helmand Valley project obtained in Washington and Afghanistan and on the extensive inspections and conferences conducted on the ground during a six-weeks' period from July 19 to August 29, 1956. Certain phases of the report are, in large part, the work of individual team members but have been concurred in by all members of the team. The body of the report is preceded by a general summary of conclusions and recommendations.

Respectfully submitted,

Leonard B. Jordan

Leonard B. Jordan

Approved

TUDOR ENGINEERING COMPANY

Ralph A. Tudor

Ralph A. Tudor

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